(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
20 February 2003 (20.02.2003)

PCT

(10) International Publication Number
WO 03/014388 A2

(51) International Patent Classification⁷: C12Q 1/68

(21) International Application Number: PCT/EP02/08939

(22) International Filing Date: 9 August 2002 (09.08.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
101 39 283.4 9 August 2001 (09.08.2001) DE

(71) Applicant *(for all designated States except US)*: **EPIGENOMICS AG** [DE/DE]; Kastanienallee 24, 10435 Berlin (DE).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: **DISTLER, Jürgen** [DE/DE]; Hewaldstrasse 2, 10825 Berlin (DE). **MODEL, Fabian** [DE/DE]; Debenzerstrasse 73, 12683 Berlin (DE). **TAUBERT, Heike** [DE/DE]; Köhlerstrasse 47, 12205 Berlin (DE).

(74) Agent: **SCHUBERT, Klemens**; Neue Promenade 5, 10178 Berlin (DE).

(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *without international search report and to be republished upon receipt of that report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 03/014388 A2

(54) Title: METHOD AND NUCLEIC ACIDS FOR THE ANALYSIS OF COLON CANCER

(57) **Abstract:** The present invention relates to chemically modified genomic sequences, oligonucleotides and/or PNA-oligomers for detecting the cytosine methylation state of genomic DNA, as well as to methods for ascertaining genetic and/or epigenetic parameters of genes for use in the characterisation, grading, staging, and/or diagnosis of colon cancer, or the predisposition to colon cancer.

Method and nucleic acids for the analysis of colon cancer

Field of the Invention

The levels of observation that have been studied by the methodological developments of recent years in molecular biology, are the genes themselves, the translation of these genes into RNA, and the resulting proteins. The question of which gene is switched on at which point in the course of the development of an individual, and how the activation and inhibition of specific genes in specific cells and tissues are controlled is correlatable to the degree and character of the methylation of the genes or of the genome. In this respect, pathogenic conditions may manifest themselves in a changed methylation pattern of individual genes or of the genome.

The present invention relates to nucleic acids, oligonucleotides, PNA-oligomers, and to a method for the characterisation, grading, staging, treatment and/or diagnosis of colon cancer, or the predisposition to colon cancer, by analysis of the genetic and/or epigenetic parameters of genomic DNA and, in particular, with the cytosine methylation status thereof.

Prior Art

Colon cancer is the second most common cause of cancer death in the United States. It describes any cancer in the colon (large intestine), from the beginning of the colon (cecum) to the end of the colon (rectum). Colon cancer is a malignant tumor in the lining of the large intestine. It starts with a single cell that mutates and grows into a visible polyp. If a polyp is allowed to remain in the colon it can grow into a cancerous tumor that

can invade other organs. The mechanism behind the progression to malignancy are not comletely understood, however most polyps take 3-7 years to become cancerous. Prevention of colon cancer means stopping this process by removing the polyp before it becomes cancerous. Colon cancer represents an interaction between the genome of the colorectal epithelial cell and the host environment. Both factors are essential for the development of tumors. Colon cancers can be differentiated into nonhereditary types, which rarely occur before age 40 and hereditary colon cancers which often occur in younger people.

Human colon cancers undergo a multistage carcinogenesis pathway from adenomatous polyps to carcinoma. A number of genetic events have been characterized and include alterations in "tumor suppressor" and susceptibility genes that normally encode for proteins regulating cell cycle progression and programmed cell death (Kinzler KW, Vogelstein B. Landscaping the cancer terrain. Science. 1998 May 15;280(5366):1036-7).Given the high incidence of colon cancer in the aging population and high mortality rates for advanced disease, new prevention strategies are needed. After the diagnosis of cancer has been made it is important to determine the extent or 'stage' of the cancer before deciding on the treatment plan. Staging is a method of evaluating the progress of the cancer in a patient and defines the extent to which the cancer has spread to other parts of the body. There are several systems for classifying the extent or stage of cancer. One of the the two most common systems is the Stage 'I, II, III, IV' system, which defines four stages of cancer. Stage I represents early cancer, with a small tumor and no spread to the lymph nodes. In stages II and III, the tumor is progressively more advanced, while stage IV refers to metastatic disease that has spread to other areas of the body. One very important point to realize about

these staging systems is that they only provide rough estimates of the stage of disease and chances of survival. The numbers are just averages. They do not say anything about the outcome or prognosis of any one particular patient.

Genes which are associated with colon cancer include the following.

p16 (Dai CY, Furth EE, Mick R, Koh J, Takayama T, Niitsu Y, Enders GH. p16(INK4a) expression begins early in human colon neoplasia and correlates inversely with markers of cell proliferation. Gastroenterology. 2000 Oct; 119(4):929-42).

p27 (Liu DF, Ferguson K, Cooper GS, Grady WM, Willis J. p27 cell-cycle inhibitor is inversely correlated with lymph node metastases in right-sided colon cancer. J Clin Lab Anal. 1999;13(6):291-5).

p53 (Arango D, Corner GA, Wadler S, Catalano PJ, Augenlicht LH. c-myc/p53 interaction determines sensitivity of human colon carcinoma cells to 5-fluorouracil in vitro and in vivo.Cancer Res. 2001 Jun 15;61(12):4910-5).

cdc2 (Moragoda L, Jaszewski R, Majumdar AP. Curcumin induced modulation of cell cycle and apoptosis in gastric and colon cancer cells. Anticancer Res. 2001 Mar-Apr; 21(2A):873-8).

PCNA (Zhang Y, Iwama T, Sugihara K. Histochemical study of apoptosis and cell proliferation in hereditary intestinal diseases. J Med Dent Sci. 1998 Jun;45(2):77-84).

CEA (Vogel I, Francksen H, Soeth E, Henne-Bruns D, Kremer B, Juhl H. The carcinoembryonic antigen and its prognostic impact on immunocytologically detected intraperitoneal colorectal cancer cells. Am J Surg. 2001 Feb;181(2):188-93).

c-erbB2 (Fric P, Sovova V, Sloncova E, Lojda Z, Jirasek A, Cermak J. Different expression of some molecular mark-

ers in sporadic cancer of the left and right colon. Eur J Cancer Prev. 2000 Aug; 9(4):265-8). Estrogen receptor (Campbell-Thompson M, Lynch IJ, Bhardwaj B. Expression of estrogen receptor (ER) subtypes and ERbeta isoforms in colon cancer. Cancer Res. 2001 Jan 15;61(2):632-40). Progesterone receptor (Reich O, Regauer S, Urdl W, Lahousen M, Winter R. Expression of oestrogen and progesterone receptors in low-grade endometrial stromal sarcomas. Br J Cancer. 2000 Mar;82(5):1030-4) and myoglobin (Nakao A, Sakagami K, Uda M, Mitsuoka S, Ito H. Carcinosarcoma of the colon: report of a case and review of the literature. J Gastroenterol. 1998 Apr;33(2):276-9).

5-methylcytosine is the most frequent covalent base modification in the DNA of eukaryotic cells. It plays a role, for example, in the regulation of the transcription, in genetic imprinting, and in tumorigenesis. Therefore, the identification of 5-methylcytosine as a component of genetic information is of considerable interest. However, 5-methylcytosine positions cannot be identified by sequencing since 5-methylcytosine has the same base pairing behavior as cytosine. Moreover, the epigenetic information carried by 5-methylcytosine is completely lost during PCR amplification.

A relatively new and currently the most frequently used method for analyzing DNA for 5-methylcytosine is based upon the specific reaction of bisulfite with cytosine which, upon subsequent alkaline hydrolysis, is converted to uracil which corresponds to thymidine in its base pairing behavior. However, 5-methylcytosine remains unmodified under these conditions. Consequently, the original DNA is converted in such a manner that methylcytosine, which originally could not be distinguished from cytosine by its hybridization behavior, can now be de-

tected as the only remaining cytosine using "normal" molecular biological techniques, for example, by amplification and hybridization or sequencing. All of these techniques are based on base pairing which can now be fully exploited. In terms of sensitivity, the prior art is defined by a method which encloses the DNA to be analyzed in an agarose matrix, thus preventing the diffusion and renaturation of the DNA (bisulfite only reacts with single-stranded DNA), and which replaces all precipitation and purification steps with fast dialysis (Olek A, Oswald J, Walter J. A modified and improved method for bisulphite based cytosine methylation analysis. Nucleic Acids Res. 1996 Dec 15;24(24):5064-6). Using this method, it is possible to analyze individual cells, which illustrates the potential of the method. However, currently only individual regions of a length of up to approximately 3000 base pairs are analyzed, a global analysis of cells for thousands of possible methylation events is not possible. However, this method cannot reliably analyze very small fragments from small sample quantities either. These are lost through the matrix in spite of the diffusion protection.

An overview of the further known methods of detecting 5-methylcytosine may be gathered from the following review article: Rein, T., DePamphilis, M. L., Zorbas, H., Nucleic Acids Res. 1998, 26, 2255.

To date, barring few exceptions (e.g., Zeschnigk M, Lich C, Buiting K, Doerfler W, Horsthemke B. A single-tube PCR test for the diagnosis of Angelman and Prader-Willi syndrome based on allelic methylation differences at the SNRPN locus. Eur J Hum Genet. 1997 Mar-Apr;5(2):94-8) the bisulfite technique is only used in research. Always, however, short, specific fragments of a known gene are amplified subsequent to a bisulfite treatment and either

completely sequenced (Olek A, Walter J. The preimplantation ontogeny of the H19 methylation imprint. Nat Genet. 1997 Nov;17(3):275-6) or individual cytosine positions are detected by a primer extension reaction (Gonzalgo ML, Jones PA. Rapid quantitation of methylation differences at specific sites using methylation-sensitive single nucleotide primer extension (Ms-SNuPE). Nucleic Acids Res. 1997 Jun 15;25(12):2529-31, WO Patent 9500669) or by enzymatic digestion (Xiong Z, Laird PW. COBRA: a sensitive and quantitative DNA methylation assay. Nucleic Acids Res. 1997 Jun 15;25(12):2532-4). In addition, detection by hybridization has also been described (Olek et al., WO 99 28498).

Further publications dealing with the use of the bisulfite technique for methylation detection in individual genes are: Grigg G, Clark S. Sequencing 5-methylcytosine residues in genomic DNA. Bioessays. 1994 Jun;16(6):431-6, 431; Zeschnigk M, Schmitz B, Dittrich B, Buiting K, Horsthemke B, Doerfler W. Imprinted segments in the human genome: different DNA methylation patterns in the Prader-Willi/Angelman syndrome region as determined by the genomic sequencing method. Hum Mol Genet. 1997 Mar;6(3):387-95; Feil R, Charlton J, Bird AP, Walter J, Reik W. Methylation analysis on individual chromosomes: improved protocol for bisulphite genomic sequencing. Nucleic Acids Res. 1994 Feb 25;22(4):695-6; Martin V, Ribieras S, Song-Wang X, Rio MC, Dante R. Genomic sequencing indicates a correlation between DNA hypomethylation in the 5' region of the pS2 gene and its expression in human breast cancer cell lines. Gene. 1995 May 19;157(1-2):261-4; WO 97/46705, WO 95/15373 and WO 95/45560.

An overview of the Prior Art in oligomer array manufacturing can be gathered from a special edition of Nature

Genetics (Nature Genetics Supplement, Volume 21, January 1999), published in January 1999, and from the literature cited therein.

Fluorescently labeled probes are often used for the scanning of immobilized DNA arrays. The simple attachment of Cy3 and Cy5 dyes to the 5'-OH of the specific probe are particularly suitable for fluorescence labels. The detection of the fluorescence of the hybridized probes may be carried out, for example via a confocal microscope. Cy3 and Cy5 dyes, besides many others, are commercially available.

Matrix Assisted Laser Desorption Ionization Mass Spectrometry (MALDI-TOF) is a very efficient development for the analysis of biomolecules (Karas M, Hillenkamp F. Laser desorption ionization of proteins with molecular masses exceeding 10,000 daltons. Anal Chem. 1988 Oct 15;60(20):2299-301). An analyte is embedded in a light-absorbing matrix. The matrix is evaporated by a short laser pulse thus transporting the analyte molecule into the vapor phase in an unfragmented manner. The analyte is ionized by collisions with matrix molecules. An applied voltage accelerates the ions into a field-free flight tube. Due to their different masses, the ions are accelerated at different rates. Smaller ions reach the detector sooner than bigger ones.

MALDI-TOF spectrometry is excellently suited to the analysis of peptides and proteins. The analysis of nucleic acids is somewhat more difficult (Gut I G, Beck S. DNA and Matrix Assisted Laser Desorption Ionization Mass Spectrometry. Current Innovations and Future Trends. 1995, 1; 147-57). The sensitivity to nucleic acids is approximately 100 times worse than to peptides and decreases disproportionally with increasing fragment size.

For nucleic acids having a multiply negatively charged backbone, the ionization process via the matrix is considerably less efficient. In MALDI-TOF spectrometry, the selection of the matrix plays an eminently important role. For the desorption of peptides, several very efficient matrixes have been found which produce a very fine crystallization. There are now several responsive matrixes for DNA, however, the difference in sensitivity has not been reduced. The difference in sensitivity can be reduced by chemically modifying the DNA in such a manner that it becomes more similar to a peptide. Phosphorothioate nucleic acids in which the usual phosphates of the backbone are substituted with thiophosphates can be converted into a charge-neutral DNA using simple alkylation chemistry (Gut IG, Beck S. A procedure for selective DNA alkylation and detection by mass spectrometry. Nucleic Acids Res. 1995 Apr 25;23(8):1367-73). The coupling of a charge tag to this modified DNA results in an increase in sensitivity to the same level as that found for peptides. A further advantage of charge tagging is the increased stability of the analysis against impurities which make the detection of unmodified substrates considerably more difficult.

Genomic DNA is obtained from DNA of cell, tissue or other test samples using standard methods. This standard methodology is found in references such as Fritsch and Maniatis eds., Molecular Cloning: A Laboratory Manual, 1989.

Description of the invention

The present invention discloses that atypical methylation in the genes estrogen receptor, p21, p27, p16, progesteron receptor, myoglobin, pcna, cdc2, c-erbB2, p53 and CEA, can be positively correlated with colon carcinogenesis. This allows the detection of colon carcinoma, or

the predisposition to colon cancer by an assay that detects methylation in the genes by restriction enzyme analysis, or using a nucleic acid based method.

The disclosed invention provides a method and nucleic acids for the analysis of colon carcinomas. It discloses a means of distinguishing between healthy and cancerous colon tissue. This provides a means for the improved diagnosis, prognosis, staging and grading of colon cancer, at a molecular level, as opposed to currently used methods of a relatively subjective nature such as histological analysis. Furthermore, the disclosed invention presents improvements over the state of the art in that current methods of histological and cytological analysis require that the biopsy contain a sufficient amount of tissue. The method according to the present invention can be used for classification of minute samples.

The invention provides a method for detecting a colon cell proliferative disorder characterised in that the target nucleic acid of one or more genes taken from the group comprising estrogen receptor, p21, p27, p16, progesteron receptor, myoglobin, pcna, cdc2, c-erbB2, p53 and CEA are contacted with a reagent or series of reagents capable of distinguishing between methylated and non methylated CpG dinucleotides within the target sequence.

The present invention makes available a method for ascertaining genetic and/or epigenetic parameters of genomic DNA. The method is for use in the grading, staging, treatment and/or diagnosis of colon cancer. The method enables the analysis of cytosine methylations and single nucleotide polymorphisms.

In one embodiment of the method the genomic DNA sample is first isolated from tissue or cellular sources. Such sources may include cell lines, histological slides, body fluids, or tissue embedded in paraffin. Extraction may be by means that are standard to one skilled in the art, these include the use of detergent lysates, sonification and vortexing with glass beads. Once the nucleic acids have been extracted the genomic double stranded DNA is used in the analysis.

In a preferred embodiment the DNA may be cleaved prior to the chemical treatment, this may be any means standard in the state of the art, in particular with restriction endonucleases.

In the third step of the method, the genomic DNA sample is treated in such a manner that cytosine bases which are unmethylated at the 5'-position are converted to uracil, thymine, or another base which is dissimilar to cytosine in terms of hybridization behavior. This will be understood as ' pretreatment' hereinafter.

The above described treatment of genomic DNA is preferably carried out with bisulfite (sulfite, disulfite) and subsequent alkaline hydrolysis which results in the conversion of non-methylated cytosine nucleobases to uracil or to another base which is dissimilar to cytosine in terms of base pairing behavior.

In the fourth step of the method the bisulfite treated DNA is analysed using one or a combination of several methods which are known in the art namely real time PCR (Methyl Light assay), blocking oligonucleotides, methylation specific single nucleotide polymorphism extension (hereinafter referred to as MsSNuPE), methylation spe-

cific PCR (hereinafter referred to as MSP), and nucleic acid sequencing.

Fluorescence-based Real Time Quantitative PCR (Heid et al., Genome Res. 6:986-994, 1996) employs a dual-labeled fluorescent oligonucleotide probe (e.g. TaqMan™ PCR, using an ABI Prism 7700 Sequence Detection System, Perkin Elmer Applied Biosystems, Foster City, California) that is hybridized concurrently with oligonucleotide primers during a continuosly monitered polymerase chain reaction.. The TaqMan™ PCR reaction employs the use of a nonextendible interrogating oligonucleotide, called a TaqMan™ probe, which is designed to hybridize to a GpC-rich sequence located between the forward and reverse amplification primers. The TaqMan™ probe further comprises a fluorescent "reporter moiety" and a "quencher moiety" covalently bound to linker moieties (e.g., phosphoramidites) attached to the nucleotides of the TaqMan™ oligonucleotide. For analysis of methylation within nucleic acids subsequent to bisulphite treatment it is required that the probe be methylation specific, as described in U.S. 6,331,393, also known as the Methyl Light assay. Variations on the TaqMan™ detection methodology that are also suitable for use with the described invention include the use of dual probe technology (Lightcycler™) or fluorescent amplification primers (Sunrise™ technology). Both these techniques may be adapted in a manner suitable for use with bisulphite treated DNA, and moreover for methylation analysis within CpG dinucleotides.

A further suitable method for the for the assessment of methylation by analysis of bisulphite treated nucleic acids is the use of blocker oligonucleotides. The use of such oligonucleotides has been described in BioTechniques 23(4), 1997, 714-720 D. Yu, M.Mukai, Q. Liu, C. Steinman. Blocking probe oligonucleotides are hybridised to the bi-

sulphite treated nucleic acid concurrently with the PCR primers. PCR amplification of the nucleic acid is terminated at the 5' position of the blocking probe, thereby amplification of a nucleic acid is suppressed wherein the complementary sequence to the blocking probe is present. The probes may be designed to hybridise to the bisulphite treated nucleic acid in a methylation status specific manner. For example, for detection of methylated nucleic acids within a population of unmethylated nucleic acids suppression of the amplification of nucleic acids which are unmethylated at the position in question would be carried out by the use of blocking probes comprising a 'CG' at the position in question, as opposed to a 'CA'.

In a further preferred embodiment of the method the analysis is carried out by the use of template directed oligonucleotide extension, such as MS SNuPE as described by Gonzalgo and Jones (Nucleic Acids Res. 25:2529-2531).

In an alternative embodiment of the method the assessment of the methylation state fo the CpG dinucleotides may be carried out by PCR analysis of the treated nucleic acid(s) using methylation specific PCR. Methylation specific primers (MSP) have been described, for example in U.S. Patent 6,265,171 to Herman et al. MSP primers consist of an oligonucleotide specific for annealing to a nucleotide sequence containing at least one bisulphite treated CpG dinucleotide. Therefore the sequence of said primers includes at least one CG , TG or CA dinucleotide. MSP primers specific for non methylated DNA contain a 'T' at the 3' position of the C position in the CpG. MSP primers generally contain relatively few cytosines as these are converted by the bisulphite reaction. However when the primers are specifc for methylated cytosine dinucleotides said cytosine positions are conserved within the primer oligonucleotides.

The primers are extended by means of a polymerase and the resultant double stranded nucleic is denatured, preferably by means of heat treatment. Successive cycles of primer annealing, extension and denaturation are carried out according to the polymerase chain reaction as described in U.S. Pat. No. 4,582,788 to Mullis.

In a further embodiment of the method the analysis is enabled by sequencing and subsequent sequence analysis of the amplificate generated in the third step of the method (Sanger F., et al., 1977 PNAS USA 74: 5463-5467).

In a particularly preferred embodiment, the method comprises the following steps:

In the first step of the method the genomic DNA sample must be isolated from tissue or cellular sources. Such sources may include cell lines, histological slides, body fluids, or tissue embedded in paraffin. Extraction may be by means that are standard to one skilled in the art, these include the use of detergent lysates, sonification and vortexing with glass beads. Once the nucleic acids have been extracted the genomic double stranded DNA is used in the analysis.

In a preferred embodiment the DNA may be cleaved prior to the chemical treatment, this may be any means standard in the state of the art, in particular with restriction endonucleases.

In the second step of the method, the genomic DNA sample is treated in such a manner that cytosine bases which are unmethylated at the 5′-position are converted to uracil, thymine, or another base which is dissimilar to cytosine

in terms of hybridization behavior. This will be understood as ' pretreatment' hereinafter.

The above described treatment of genomic DNA is preferably carried out with bisulfite (sulfite, disulfite) and subsequent alkaline hydrolysis which results in the conversion of non-methylated cytosine nucleobases to uracil or to another base which is dissimilar to cytosine in terms of base pairing behavior.

In the third step fragments of the pretreated DNA are amplified, using sets of primer oligonucleotides according to Seq ID 76 to 97, and a, preferably heat-stable polymerase. Because of statistical and practical considerations, preferably more than ten different fragments having a length of 100 - 2000 base pairs are amplified. The amplification of several DNA segments can be carried out simultaneously in one and the same reaction vessel. Usually, the amplification is carried out by means of a polymerase chain reaction (PCR).

The method may also be enabled by the use of alternative primers, the design of such primers is obvious to one skilled in the art. These should include at least two oligonucleotides whose sequences are each reverse complementary or identical to an at least 18 base-pair long segment of the base sequences specified in the appendix (Seq. ID No.32 through Seq. ID No.75). Said primer oligonucleotides are preferably characterized in that they do not contain any CpG dinucleotides. In a particularly preferred embodiment of the method, the sequence of said primer oligonucleotides are designed so as to selectively anneal to and amplify, only the colon tissue specific DNA of interest, thereby minimizing the amplification of background or non relevant DNA. In the context of the present invention, background DNA is taken to mean ge-

nomic DNA which does not have a relevant tissue specific methylation pattern, in this case, the relevant tissue being colon tissue, both healthy and diseased.

According to the present invention, it is preferred that at least one primer oligonucleotide is bound to a solid phase during amplification. The different oligonucleotide and/or PNA-oligomer sequences can be arranged on a plane solid phase in the form of a rectangular or hexagonal lattice, the solid phase surface preferably being composed of silicon, glass, polystyrene, aluminum, steel, iron, copper, nickel, silver, or gold, it being possible for other materials such as nitrocellulose or plastics to be used as well.

The fragments obtained by means of the amplification can carry a directly or indirectly detectable label. Preferred are labels in the form of fluorescence labels, radionuclides, or detachable molecule fragments having a typical mass which can be detected in a mass spectrometer, it being preferred that the fragments that are produced have a single positive or negative net charge for better detectability in the mass spectrometer. The detection may be carried out and visualized by means of matrix assisted laser desorption/ionization mass spectrometry (MALDI) or using electron spray mass spectrometry (ESI).

The amplificates obtained in the third step of the method are subsequently hybridized to an array or a set of oligonucleotides and/or PNA probes. In this context, the hybridization takes place in the manner described in the following. The set of probes used during the hybridization is preferably composed of at least 10 oligonucleotides or PNA-oligomers. In the process, the amplificates serve as probes which hybridize to oligonucleotides previously bonded to a solid phase. Ina particularly pre-

ferred embodiment, the oligonucleotides are taken from the group comprising Seq IDs 98 to 523. The non-hybridized fragments are subsequently removed. Said oligonucleotides contain at least one base sequence having a length of 10 nucleotides which is reverse complementary or identical to a segment of the base sequences specified in the appendix, the segment containing at least one CpG dinucleotide. The cytosine of the CpG dinucleotide is the 5^{th} to 9^{th} nucleotide from the 5'-end of the 10-mer. One oligonucleotide exists for each CpG dinucleotide.

In the next step of the method, the non-hybridized amplificates are removed.

In the final step of the method, the hybridized amplificates are detected. In this context, it is preferred that labels attached to the amplificates are identifiable at each position of the solid phase at which an oligonucleotide sequence is located.

According to the present invention, it is preferred that the labels of the amplificates are fluorescence labels, radionuclides, or detachable molecule fragments having a typical mass which can be detected in a mass spectrometer. The mass spectrometer is preferred for the detection of the amplificates, fragments of the amplificates or of probes which are complementary to the amplificates, it being possible for the detection to be carried out and visualized by means of matrix assisted laser desorption/ionization mass spectrometry (MALDI) or using electron spray mass spectrometry (ESI). The produced fragments may have a single positive or negative net charge for better detectability in the mass spectrometer.

The aforementioned method is preferably used for ascertaining genetic and/or epigenetic parameters of genomic DNA.

In order to enable this method, the invention further provides the chemically modified DNA of the genes estrogen receptor, p21, p27, p16, progesteron receptor, myoglobin, pcna, cdc2, c-erbB2, p53 and CEA as well as oligonucleotides and/or PNA-oligomers for detecting cytosine methylations. The present invention is based on the discovery that genetic and epigenetic parameters and, in particular, the cytosine methylation patterns of genomic DNA are particularly suitable for characterisation, grading, staging, and/or diagnosis of colon cancer.

The nucleic acids according to the present invention of Seq. ID No.12 through Seq. ID No. 523 can be used for characterisation, grading, staging and/or diagnosis of genetic and/or epigenetic parameters of genomic DNA.

This objective is achieved according to the present invention using a nucleic acid containing a sequence of at least 18 bases in length of the chemically pretreated genomic DNA according to one of Seq. ID No.32 through Seq. ID No.75 and sequences complementary thereto.

The chemically modified nucleic acid could heretofore not be connected with the ascertainment of disease relevant genetic and epigenetic parameters.

The object of the present invention is further achieved by an oligonucleotide or oligomer for the analysis of pretreated DNA, for detecting the genomic cytosine methylation state, said oligonucleotide containing at least one base sequence having a length of at least 10 nucleotides which hybridizes to a pretreated genomic DNA ac-

cording to Seq. ID No.32 through Seq. ID No. 75. The oligomer probes according to the present invention constitute important and effective tools which, for the first time, make it possible to ascertain specific genetic and epigenetic parameters of colon cancers, in particular, for use in characterisation, grading, staging, and/or diagnosis of colon cancer. The base sequence of the oligomers preferably contains at least one CpG dinucleotide. The probes may also exist in the form of a PNA (peptide nucleic acid) which has particularly preferred pairing properties. Particularly preferred are oligonucleotides according to the present invention in which the cytosine of the CpG dinucleotide is the 5^{th} - 9^{th} nucleotide from the 5'-end of the 13-mer; in the case of PNA-oligomers, it is preferred for the cytosine of the CpG dinucleotide to be the 4^{th} - 6^{th} nucleotide from the 5'-end of the 9-mer.

The oligomers according to the present invention are normally used in so called "sets" which contain at least one oligomer for each of the CpG dinucleotides of the sequences of Seq. ID No. 32 to Seq. ID No. 75. Preferred is a set which contains at least one oligomer for each of the CpG dinucleotides from one of Seq. ID No. 32 to Seq. ID No. 75 .

In the case of the sets of oligonucleotides according to the present invention, it is preferred that at least one oligonucleotide is bound to a solid phase. It is further preferred that all the oligonucleotides of one set are bound to a solid phase.

The present invention moreover relates to a set of at least 10 n (oligonucleotides and/or PNA-oligomers) used for detecting the cytosine methylation state in chemically pretreated genomic DNA (Seq. ID No.32 to Seq. ID No.75

No.75 and sequences complementary thereto). These probes enable characterisation, grading, staging and/or diagnosis of genetic and epigenetic parameters of colon cancer. Furthermore, the probes enable the diagnosis of predisposition to colon cancer. The set of oligomers may also be used for detecting single nucleotide polymorphisms (SNPs) in pretreated genomic DNA according to one of Seq. ID No. 32 to Seq. ID No. 75.

According to the present invention, it is preferred that an arrangement of different oligonucleotides and/or PNA-oligomers (a so-called "array") made available by the present invention is present in a manner that it is likewise bound to a solid phase. This array of different oligonucleotide- and/or PNA-oligomer sequences can be characterized in that it is arranged on the solid phase in the form of a rectangular or hexagonal lattice. The solid phase surface is preferably composed of silicon, glass, polystyrene, aluminum, steel, iron, copper, nickel, silver, or gold. However, nitrocellulose as well as plastics such as nylon which can exist in the form of pellets or also as resin matrices are possible as well.

Therefore, a further subject matter of the present invention is a method for manufacturing an array fixed to a carrier material for the grading, staging, and/or diagnosis of colon cancer, in which method at least one oligomer according to the present invention is coupled to a solid phase. Methods for manufacturing such arrays are known, for example, from US Patent 5,744,305 by means of solid-phase chemistry and photolabile protecting groups.

A further subject matter of the present invention relates to a DNA chip for the characterisation, grading, staging, and/or diagnosis of colon cancer. Furthermore the DNA chip enables the diagnosis of predisposition to colon

cancer. The DNA chip contains at least one nucleic acid according to the present invention. DNA chips are known, for example, in US Patent 5,837,832.

Moreover, a subject matter of the present invention is a kit which may be composed, for example, of a bisulfite-containing reagent, a set of primer oligonucleotides containing at least two oligonucleotides whose sequences in each case correspond or are complementary to a 18 base long segment of the base sequences specified in the appendix (Seq. ID No.32 through Seq. ID No.75), oligonucleotides and/or PNA-oligomers as well as instructions for carrying out and evaluating the described method. However, a kit along the lines of the present invention can also contain only part of the aforementioned components.

The oligomers according to the present invention or arrays thereof as well as a kit according to the present invention are intended to be used for the characterisation, grading, staging and/or diagnosis of colon cancer, or diagnosis of predisposition to colon cancer. According to the present invention, the method is preferably used for the analysis of important genetic and/or epigenetic parameters within genomic DNA, in particular for use in characterisation, grading, staging and/or diagnosis of colon cancer, and predisposition to colon cancer.

The methods according to the present invention are used, for example, for characterisation, grading, staging and/or diagnosis of colon cancer.

A further embodiment of the invention is a method for the analysis of the methylation status of genomic DNA without the need for chemical pretreatment. In the first step of the method the genomic DNA sample must be isolated from

tissue or cellular sources. Such sources may include cell lines, histological slides, body fluids, or tissue embedded in paraffin; for example, brain, central nervous system or lymphatic tissue. Extraction may be by means that are standard to one skilled in the art, these include the use of detergent lysates, sonification and vortexing with glass beads. Once the nucleic acids have been extracted the genomic double stranded DNA is used in the analysis.

In a preferred embodiment the DNA may be cleaved prior to the chemical treatment, this may be any means standard in the state of the art, in particular with restriction endonucleases. In the second step, the DNA is then digested with methylation sensitive restriction enzymes. The digestion is carried out such that hydrolysis of the DNA at the restriction site is informative of the methylation status of a specific CpG dinucleotide.

In the third step the restriction fragments are amplified. In a preferred embodiment this is carried out using a polymerase chain reaction.

In the final step the amplificates are detected. The detection may be by any means standard in the art, for example, but not limited to, gel electrophoresis analysis, hybridisation analysis, incorporation of detectable tags within the PCR products, DNA array analysis, MALDI or ESI analysis.

The present invention moreover relates to the diagnosis and/or prognosis of events which are disadvantageous or relevant to patients or individuals in which important genetic and/or epigenetic parameters within genomic DNA, said parameters obtained by means of the present invention may be compared to another set of genetic and/or epigenetic parameters, the differences serving as the ba-

sis for a diagnosis and/or prognosis of events which are disadvantageous or relevant to patients or individuals.

In the context of the present invention the term "hybridization" is to be understood as a bond of an oligonucleotide to a completely complementary sequence along the lines of the Watson-Crick base pairings in the sample DNA, forming a duplex structure.

The term "functional variants" denotes all DNA sequences which are complementary to a DNA sequence, and which hybridize to the reference sequence under stringent conditions.

In the context of the present invention, "genetic parameters" are mutations and polymorphisms of genomic DNA and sequences further required for their regulation. To be designated as mutations are, in particular, insertions, deletions, point mutations, inversions and polymorphisms and, particularly preferred, SNPs (single nucleotide polymorphisms).

In the context of the present invention, "epigenetic parameters" are, in particular, cytosine methylations and further chemical modifications of DNA bases of genomic DNA and sequences further required for their regulation. Further epigenetic parameters include, for example, the acetylation of histones which, cannot be directly analyzed using the described method but which, in turn, correlates with the DNA methylation.

In the following, the present invention will be explained in greater detail on the basis of the sequences and examples without being limited thereto.

Seq. ID 1 to 11 represent the genomic DNA of genes estrogen receptor, p21, p27, p16, progesteron receptor, myoglobin, pcna, cdc2, c-erbB2, p53 and CEA. These sequences are derived from Genbank and will be taken to include all minor variations of the sequence material which are currently unforseen, for example, but not limited to, minor deletions and SNPs.

Sequence ID 12 to 31 represent segments of genomic DNA which are particularly useful for the determination of colon cell proliferative disorder.

Sequence ID 32 to 75 exhibit the chemically pretreated sequence of genes estrogen receptor, p21, p27, p16, progesteron receptor, myoglobin, pcna, cdc2, c-erbB2, p53 and CEA. These sequences will be taken to include all minor variations of the sequence material which are currently unforseen, for example, but not limited to, minor deletions and SNPs.

Sequences having even sequence numbers (e.g., Seq. ID No. 32, 34, 36, ...) exhibit in each case sequences of chemically pretreated genomic DNAs.

Sequences having odd sequence numbers (e.g., Seq. ID No. 33, 35, 37 ...) exhibit in each case the sequences of chemically pretreated genomic DNAs. Said genomic DNAs are complementary to the genomic DNAs from which the preceeding sequence was derived (e.g., the complementary sequence to the genomic DNA from which Seq. ID No.32 is derived is the genomic sequence from which Seq. ID No.33 is derived, the complementary sequence to the genomic DNA from which Seq. ID No.33 is derived is the sequence from which Seq. ID No.34 is derived, etc.)

Sequence ID 76 to 97 exhibit the sequence of primer oligonucleotides for the amplification of chemically pretreated DNA according to Sequence IDs 32 to 75.

Sequence IDs 98 to 523 exhibit the sequence of oligomers which are particularly useful for the analysis of CpG positions within chemically pretreated DNA according to Sequence IDs 32 to 75.

The following examples describe the invention in detail without limiting the scope of the invention.

Example 1: Description of PCR

The single gene PCR reaction was performed using a thermocycler (Epperdorf GmbH) using 10 ng of bisulfite treated DNA, 6 pmole of each primer, 200 µM of each dNTP, 1.5 mM $MgCl_2$ and 1 U of HotstartTaq (Qiagen AG). The other conditions were as recommended by the Taq polymerase manufacturer. Single genes were amplified by PCR performing a first denaturation step for 14 min at 96 °C, followed by 39 cycles (60 sec at 96°C, 45 sec at 55 °C , 75 sec at 72 °C) and a subsequent final elongation of 10 min at 72 °C. The bisulfite DNA was prepared according to a published procedure from genomic DNA individually isolated from 12 matched samples of adenocarzinoma of the colon and healthy colon tissue. The genomic DNA was isolated using the wizzard DNA isolation kit (Promega, Madison).

Example 2 : Methylation analysis of gene p16.

The following example relates to a fragment of the gene p16 in which a specific CG dinucleotide is to be analyzed for methylation.

In the first step, a genomic sequence is treated using bisulfite (hydrogen sulfite, disulfite) in such a manner

that all cytosines which are not methylated at the 5-position of the base are modified in such a manner that a different base is substituted with regard to the base pairing behavior while the cytosines methylated at the 5-position remain unchanged.

If bisulfite solution is used for the reaction, then an addition takes place at the non-methylated cytosine bases. Moreover, a denaturating reagent or solvent as well as a radical interceptor must be present. A subsequent alkaline hydrolysis then gives rise to the conversion of non-methylated cytosine nucleobases to uracil. The chemically converted DNA is then used for the detection of methylated cytosines. In the second method step, the treated DNA sample is diluted with water or an aqueous solution. Preferably, the DNA is subsequently desulfonated. In the third step of the method, the DNA sample is amplified in a polymerase chain reaction, preferably using a heat-resistant DNA polymerase. In the present case, cytosines of the gene p16 are analyzed. To this end, a defined fragment having a length of 598 bp is amplified with the specific primer oligonucleotides TTGAAAATTAAGGGTTGAGG (Sequence ID 82) and CACCCTCTAATAACCAACCA (Sequence ID No. 83).

The amplificate serves as a sample which hybridizes to an oligonucleotide previously bound to a solid phase, forming a duplex structure, for example TAAGTGTTCGGAGTTAAT (SEQ ID NO: 238), the cytosine to be detected being located at position 439 of the amplificate. The detection of the hybridization product is based on Cy3 and Cy5 fluorescently labelled primer oligonucleotides which have been used for the amplification. A hybridization reaction of the amplified DNA with the oligonucleotide takes place only if a methylated cytosine was present at this location in the bisulfite-treated DNA as shown for healthy

tissue in Figure 1A. Thus, the methylation status of the specific cytosine to be analyzed is inferred from the hybridization product.

In order to verify the methylation status of the position, a sample of the amplificate is further hybridized to another oligonucleotide previously bonded to a solid phase. Said olignonucleotide is identical to the oligonucleotide previously used to analyze the methylation status of the sample, with the exception of the position in question. At the position to be analysed said oligonucleotide comprises a thymine base as opposed to a cytosine base i.e TAAGTGTTTGGAGTTAAT (SEQ ID NO: 239). Therefore, the hybridisation reaction only takes place if an unmethylated cytosine was present at the position to be analysed as shown for tumor tissue in Figure 1B.

Example 3: Differentiation between colon tumour and healthy colon tissue

Differentiation of healthy samples and adenocarzinoma tumours. For tumour class prediction between healthy and tumor tissue we used a Support Vector Machine (SVM) on a set of selected CpG sites (F. Model,P. Adorjan,A. Olek,C. Piepenbrock, Feature selection for DNA methylation based cancer classification. Bioinformatics. 2001 Jun;17 Suppl 1:S157-64.). First we ranked the CpG sites for a given separation task by their significance of the difference between the two class means. The significance of each CpG was estimated by a two sample t-test (W, Mendenhall, T, Sincich, Statistics for engineering and the sciences (Prentice-Hall, New Jersey 1995).

In order to relate the methylation patterns to a adenocarcinoma tumour, it is initially required to comparatively analyze the DNA methylation patterns of healthy tissue and adenocarzinoma tumours tissue (Figure 2 A and

B). These analyses were carried out, analogously to Examples 1. The results obtained in this manner are stored in a database and the CpG dinucleotides which are methylated differently between the two groups are identified. This can be carried out by determining individual CpG methylation rates as can be done, for example, by sequencing, which is a relatively imprecise method of quantifying methylation at a specific CpG, or else, in a very precise manner, by a methylation-sensitive "primer extension reaction". In a particularly preferred variant, as illustrated in the preceeding examples the methylation status of hundreds or thousands of CpGs may be analysed on an oligomer array. It is also possible for the patterns to be compared, for example, by clustering analyses which can be carried out, for example, by a computer.

A panel of genomic fragments of 11 different genes (listed in Table 1) were bisulphite treated and amplified by singleplex PCRs according to Example 1. However, as will be obvious to one skilled in the art, it is also possible to use other primers that amplify the genomic, bisulphite treated DNA in an adequate manner, and/or to carry out the PCRs in a multiplex format. However the primer oligonucleotide pairs as listed in Table 1 are particularly preferred. In order to differentiate adenocarzinoma tumour from healthy control samples optimal results were obtained by including at least 6 CpG dinucleotides, the most informative CpG positions for this discrimination being located within the p16, p53, CEA, c-erbB2 and estrogen receptor genes (cf. Fig. 2, Tab1). In addition, the majority of the analysed CpG dinucleotides of the panel showed different methylation patterns between the two phenotypes. The results prove that methylation fingerprints are capable of providing differential diagnosis of adenocarzinoma tumours and could therefore be applied in a large number clinical situations

For class prediction a SVM was trained on the most significant CpG positions, where the optimal number of CpG sites depends on the complexity of the separation task. Implementation of the SVM used the Sequential Minimal Optimization algorithm to find the 1-norm soft margin separating hyperplane (N. Christianini, J. Shawe-Taylor, An Introduction to Support Vector Machines,. Cambridge University Press, Cambridge 2000). The box constraint was set to C=10. Generalization performance was estimated by averaging over 50 cross validation runs on randomly permutated samples partitioned into 8 groups.

Example 4: Analysis of the methylation status of the most informative CpG positions of the genes c-erbB2, p53, CEA, p16 and ER1

The methylation status of the most informative CpG positions of the gene fragments of genes c-erbB2, p53, CEA, p16 and ER1 are shown in this example. Corresponding to Example 2, where the methylation status is demonstrated by spots, Table 2 describes in a more detailed way the methylation status of different gene fragments of various patients by calculating the methylation status of colon tumour and healthy colon tissue. The first column indicates the specific gene fragment, the second column describes the investigated CpG Oligonukleotide, the third column depicts the diagnosis of the investigated tissue (T=tumor, H=healthy) and columns 4 to 17 show the logarithm of the ratio ofv the fluorescence signal of the CG oligonucleotide versus TG oligonucleotide of colon tumour and healthy colon tissue of 14 different patients. For example, a comparison of the methylation status of gene p16, patient 11, shows that the healthy tissue is less methylated compared to the tumour tissue for this sample. The opposite ratio can be observed, for example, for gene c-erbB2 for patient 11. In this case the tumour sample is

more methylated than the healthy sample. The analyzed CpG positions show that the genes p53, CEA, p16 and ER1 are hypermethylated, whereas c-erbB2 is hypomethylated in most of the tumour samples compared with the healthy controls.

Example 5: Identification of the methylation status of CpG sites of genes CEA and p16 by methylation sensitive restriction enzyme digest.

In the CEA gene, a defined fragment having a length of 351 bp, which contains 7 CpG sites, is amplified with the specific primer oligonucleotides TGGTTAAATGTGTGGGAGAT (Sequence ID 524) and TCCTGAGTGATGTCTGTGTG (Sequence ID No. 525) and in the p16 gene, a defined fragment having a length of 391 bp, which contains 26 CpG sites, is amplified with the specific primer oligonucleotides ATGACACCAAACACCCCGAT (Sequence ID 526) and CTGTCCCTCAAATCCTCTG (Sequence ID No. 527). CGCG for gene CEA with Cytosins at positions 127 and 129 of the amplificate and CGCG for gene p16 with Cytosins at positions 362 and 364 of the amplificate, are located in a *Sac*II restriction enzyme recognition sequence, CCGCGG. The cleavage of *Sac*II is blocked by methylation of at least one of the two CpG dinucleotides.

The genomic DNA isolated from adenocarzinoma of colon tissue and from healthy colon tissue was hydrolysed by *Sac*II as recommended by the manufacturer (New England Biolabs GmbH).

10 ng of the *Sac*II restricted DNA was used as template for the amplification of the above indicated CEA and p16 gene fragments. The PCR reaction was performed using a thermocycler (Eppendorf GmbH) using 10 ng of DNA, 6 pmole of each primer, 200 µM of each dNTP, 1.5 mM MgCl2 and 1 U

of HotstartTaq (Qiagen AG). The other conditions were as recommended by the Taq polymerase manufacturer. Using the above mentioned primers, gene fragments were amplified by PCR performing a first denaturation step for 14 min at 96 °C, followed by 30 - 45 cycles (step 2: 60 sec at 96°C, step 3: 45 sec at 55 °C , step 4: 75 sec at 72 °C) and a subsequent final elongation of 10 min at 72 °C. The presence of PCR products was analysed by agrarose gel electrophoresis.

PCR products were detectable with *Sac*II hydrolyzed DNA isolated from colon cancer tissue, when step 2 to step 4 of the cycle program were repeated 34, 37, 39, 42 and 45 fold. In contrast PCR products were only detectable with *Sac*II hydrolyzed DNA isolated from healthy colon tissue when step 2 to step 4 of the cycle program were repeated 42 and 45 fold. These results indicate that at least one of CpG positions located within the *Sac*II recognition sequence of the analysed CEA and the p16 gene fragment showed a higher methylation status in cancer samples compared to the healthy control.

Description of figures

Figure 1
Figure 1 shows the hybridisation of fluorescent labelled amplificates to a surface bound olignonucleotide. Sample A being from healthy tissue and sample B being from colon adenocarzinoma tissue. Fluorescence at a spot, denoted by an arrow, indicates hybridisation of the amplificate against the olignonucleotide. Hybridisation to a CG olignonucleotide with the sequence TAAGTGTTCGGAGTTAAT (SEQ ID NO: 238) denotes methylation at the cytosine position being analysed, hybridisation to a TG olignonucleotide with the sequence TAAGTGTTTGGAGTTAAT (SEQ ID NO: 239) denotes no methylation at the cytosine position be-

ing analysed. It can be seen that sample A was umethylated for CG positions of the amplificate of gene p16 whereas in comparison sample B had a higher degree of methylation at the same position.

Figure 2

Differentiation of colon tumour(A) from healthy colon tissue(B). High probability of methylation corresponds to red, uncertainty to black and low probability to green. The labels on the left side of the plot are gene (e.g. for the topmost: 2064) and CpG (e.g. for the topmost: 1485A) identifiers. The hybridisation was carreid out with Cy5 labelled amplificates generated by singlplex PCR reactions using primer oligonucleotides as shown in Table 1. The labels on the right side give the significance (p-value, T-test) of the difference between the means of the two groups. Each row corresponds to a single CpG and each column to the methylation levels of one sample. CpGs are ordered according to their contribution to the distinction to the differential diagnosis of the two lesions with increasing contribution from top to bottom.

Table 1

List of genes, reference numbers (ID) according Fig 2 and primer oligonucleotides according to Example 2 and Figures 1 and 2.

Gene	Gene Seq-ID	Accession no	Primer Seq-ID	PCR primer	Primer Seq-ID	PCR primer
Estrogen-receptor	1	NM_000125	76	AGGAGGGGGAATTAAATAGA	77	ACAATAAAACCATCCCAAATAC
P21	2	NM_000389	78	GGATTAGTGGGAATAGAGGTG	79	AAACCCAAACTCCTAACTACC
P27	3	NM_004064	80	GTGGGGAGGTAGTTGAAGA	81	ATACACCCCTAACCCAAAAT
P16	4	NM_000077	82	TTGAAAATTAAGGGTTGAGG	83	CACCCTCTAATAACCAACCA
Progesteron-receptor	5	NM_000926	84	GAGGGGGTAGTGGAATTTAG	85	CCTTTACCTTCAACTCAATCA
Myoglobin	6	NM_005368	86	GTTTTTGGTAAAGGGGTAGAA	87	CCTAAAATATCAACCTCCACCT
PCNA	7	NM_002592	88	TTTTTAGGTTGTAAGGAGGTTTT	89	TAAATACCTCCAACACCTTTCT
CDC2	8	NM_001786	90	ATTAGAAGTGAAAGTAATGGAATTT	91	TCAATTTCCAAAAACCAAC
c-erbB2	9	NM_004448	92	GGAGGGGGTAGAGTTATTAGTT	93	TATACTTCCTCAAACAACCCTC
P53	10	NM_000546	94	GATTGGGTAAGTTTTTGATTGA	95	AAATCTCCCAACAATACAACTC
CEA	11	NM_004363	96	GTTTAGGATGGGATTAAGTGTG	97	AATCAAATATCCCCAAATACAA

Table 2

			log (fluorescence CG oligo / fluorescence TG oligo) of matched pair of colon tumour (T) and healthy colon tissue (H)[a]													
gene	*CpG*	*Diagnosis*	*11*	*3*	*9*	*1*	*8*	*2*	*4*	*13*	*12*	*14*	*15*	*5*	*10*	*6*
c-erbB2	2064:148	T	-1,07	-1,72	-1,11	-1,53	-1	-1,3	-1,63	-1,01	-1,64	-1,22	-1,33	-0,88	-1,57	-1,22
		H	-0,82	-1,09	-1,34	-1,17	-0,75	-1,09	-1,36	-0,89	-0,88	-0,72	-1,06	-0,93	-1,43	-0,7
p53	2317:122	T	-2,17	-0,58	-2,37	-1,91	-2,08	-0,32	-0,3	-1,63	-2,19	-1,87	-1,71	-4,31	-3,15	-1
		H	-4,03	-3,01	-3,14	-3,83	-1,53	-2,29	-1,86	-2,96	-2,76	-4,09	-3,44	-4,77	-2,33	-3,97
p53	2317:153	T	-2,38	-2,84	-2,77	-2,57	-2,93	-2,44	-2,89	-3,12	-2,77	-2,32	-2,7	-2,89	-2,13	-2,29
		H	-3,36	-3,36	-3,17	-3,32	-3,15	-3,47	-2	-2,94	-3,8	-3,77	-3,67	-4,12	-2,2	-3,12
CEA	2398:176	T	-2,76	-1,84	-3,7	-2,42	-2,59	-0,83	-2,14	-1,96	-2,86	-4,02	-2,76	-5,71	-5,07	-2,33
		H	-4,32	-2,64	-4,72	-3,9	-4,43	-4,85	-2,95	-3	-2,67	-4,19	-2,92	-4,63	-4,53	-3,64
CEA	2398:227	T	-3,35	-2,15	-3,83	-3,88	-4,02	-2,95	-2,81	-3,98	-3,9	-4,01	-4,75	-4,64	-4,34	-3,15
		H	-4,7	-4,37	-5,1	-5,77	-4,7	-4,64	-3,33	-3,65	-5,48	-5,2	-5,32	-5,75	-3,84	-5,4
p16	2035:181	T	-1,64	-1,99	-2,66	-2,6	-3,78	-1,07	-2,21	-2,18	-3,24	-1,8	-2,19	-3,21	-3,25	-2,13
		H	-2,74	-3,02	-4,09	-3,52	-3,74	-3,87	-2,88	-2,76	-3,28	-2,27	-3,19	-3,38	-3,88	-3,49
ER1	41:2912	T	-0,4	-0,37	-1,23	-0,96	-1,36	-0,47	0,37	-0,34	-0,76	-0,85	-0,56	-1,32	-1,53	-1,33
		H	-0,8	-1,25	-2,1	-1,23	-1,52	-1,38	-0,44	-0,93	-1,26	-1,55	-1,21	-1,55	-1	-1,45
ER1	41:2860	T	-1,06	-0,77	-2,06	-1,8	-1,7	-0,53	-1,52	-1,82	-1,19	-1,59	-0,82	-1,6	-1,85	-1,69
		H	-1,83	-2,03	-2,05	-2,22	-2,36	-2,13	-2,26	-1,72	-0,91	-2,11	-1,6	-2,05	-1,9	-2,14
ER1	41:2428	T	0,02	0,84	-1,41	-1,22	-1,39	0,67	-0,13	-0,33	-0,66	-1,41	0,22	-1,78	-1,61	-1
		H	-0,97	-0,86	-1,61	-1,36	-1,02	-1,78	-0,88	-1,05	-1,65	-1,29	-1,19	-1,53	-1,45	-1,96
ER1	41:2849	T	-0,86	-0,43	-1,55	-0,98	-1,22	-0,97	-2,16	-1,2	-0,66	-1,07	-0,54	-1,59	-1,45	-0,78
		H	-1,11	-1,04	-1,97	-1,27	-2,06	-2,21	-2,77	-1,01	-1,08	-1,59	-1,08	-1,9	-2,02	-1,76

a) the values indicate the mean of at least 12 CG/TG oligo pairs analysed in 3 independent chip hybridisation

1. A method to determine the methylation status of CpG dinucleotides within one or more of the genes estrogen receptor, p21, p27, p16, progesterone receptor, myoglobin, pcna, cdc2, c-erB2, p53 and CEA comprising contacting the target nucleic acid in a biological sample with at least one reagent or series of reagents wherein said reagent or series of reagents distinguishes between methylated and non methylated CpG dinucleotides within the target nucleic acid and concluding from the methylation status of one or more of said CpG positions on the presence or absence of a colon cell proliferative disorder.

2. A method according to Claim 1 comprising the following steps:
   - obtaining a biological sample containing genomic DNA
   - extracting the genomic DNA
   - in the genomic DNA sample, cytosine bases which are unmethylated at the 5-position are converted, by treatment, to uracil or another base which is dissimilar to cytosine in terms of base pairing behavior;
   - fragments of the pretreated genomic DNA are amplified using sets of primer oligonucleotides according to Seq ID 76 to Seq ID 97 and a polymerase, the amplificates carrying a detectable label;
   - detection of the fragments
   - Identification of the methylation status of one or more cytosine positions

3. A method according to claim 2, characterized in that the reagent is a solution of bisulfite, hydrogen sulfite or disulfite.

4. A method as recited in Claims 2 and 3, characterized in that the amplification is carried out by means of the polymerase chain reaction (PCR).

5. A method as recited in one of the Claims 2 to 4, characterized in that more than ten different fragments having a length of 100 - 2000 base pairs are amplified.

6. A method as recited in one of the Claims 2 to 5, characterized in that the amplification of several DNA segments is carried out in one reaction vessel.

7. A method as recited in one of the Claims 2 to 6, characterized in that the polymerase is a heat-resistant DNA polymerase.

8. A method as recited in one of the Claims 2 to 7, characterized in that the labels of the amplificates are fluorescence labels.

9. A method as recited in one of Claims 2 to 7, characterized in that the labels of the amplificates are radionuclides.

10. A method according to one of Claims 2 to 9, characterized in that each amplificate is detected by hybridization to an oligonucleotide or peptide nucleic acid (PNA)-oligomer.

11. A method according to claim 10, characterized in that the olignonucleotide or peptide nucleic acid (PNA)-oligomer is taken from the group comprising Seq ID 98 to 523.

12. A method as recited in one of Claims 2 to 7, characterized in that the labels of the amplificates are detachable molecule fragments having a typical mass which are detected in a mass spectrometer.

13. A method as recited in one of Claims 2 to 7 and 12, characterized in that the amplificates or fragments of the amplificates are detected in the mass spectrometer.

14. A method as recited in one of Claims 12 or 13, characterized in that the produced fragments have a single positive or negative net charge for better detectability in the mass spectrometer.

15. A method as recited in one of the Claims 12 through 14, characterized in that detection is carried out and visualized by means of matrix assisted laser desorption/ionization mass spectrometry (MALDI) or using electron spray mass spectrometry (ESI).

16. A method as recited in Claim 2, characterized in that the amplification step preferentially amplifies DNA which is of particular interest in healthy and/or diseased colon tissues, based on the specific genomic methylation status of colon tissue, as opposed to background DNA.

17. A method according to Claim 1 comprising the following steps;
a) obtaining a biological sample containing genomic DNA
b) extracting the genomic DNA,
c) digesting the target nucleic acids with one or more methylation sensitive restriction enzymes,
d) amplification of the DNA digest and

e) detection of the amplificates.

18. A method according to Claim 17 wherein the target nucleic acids comprise one or more sequences taken from the group according to Seq ID 12 to Seq ID 31 or sequences hybridising thereto and fragments thereof.

19. A method as recited in one of Claims 17 or18, characterized in that the amplification is carried out by means of the polymerase chain reaction (PCR).

20. A method as recited in one of Claims 17 to 19, characterized in that the amplification of several DNA segments is carried out in one reaction vessel.

21. A method as recited in one of Claims 17 to 20, characterized in that the polymerase is a heat-resistant DNA polymerase.

22. An isolated nucleic acid of the pretreated genomic DNA according to one of the sequences taken from the group comprising Seq. ID No.32 to Seq. ID No.75 and sequences complementary thereto.

23. An oligomer, in particular an oligonucleotide or peptide nucleic acid (PNA)-oligomer, said oligomer comprising at least one base sequence of at least 10 nucleotides which hybridizes to or is identical to a pretreated genomic DNA according to one of the Seq. ID No. 32 to Seq. ID No 75 according to claim 22.

24. An oligomer or peptide nucleic acid (PNA)-oligomer as recited in Claim 23, wherein the base sequence includes at least one CpG dinucleotide sequence.

25. An oligomer or peptide nucleic acid (PNA)-oligomer as recited in Claim 23, characterized in that the cytosine of the at least one CpG dinucleotide is/are located approximately in the middle third of the oligomer.

26. An oligomer or peptide nucleic acid (PNA)-oligomer, in particular an oligonucleotide, according to one of the sequences taken from the group comprising Seq. ID No.98 to Seq. ID No. 523.

27. A set of oligomers or peptide nucleic acid (PNA)-oligomers, comprising at least two oligomers according to any of claims 22 to 26.

28. A set of oligomers or peptide nucleic acid (PNA)-oligomers as recited in Claim 27, comprising oligomers for detecting the corresponding genomic methylation state of all CpG dinucleotides within one of the sequences according to Seq. ID Nos. 32 to 75 according to claim 22, and sequences complementary thereto.

29. A set of at least two oligonucleotides or peptide nucleic acid (PNA)-oligomers as recited in Claim 23, as primer oligonucleotides for the amplification of DNA sequences of one of Seq. ID 32 to Seq. ID 75 and/or sequences complementary thereto and segments thereof.

30. A set of oligonucleotides or peptide nucleic acid (PNA)-oligomers as recited in Claims 22 and 23, characterized in that at least one oligonucleotide is bound to a solid phase.

31. Use of a set of oligomers or peptide nucleic acid (PNA)-oligomers according to any of claims 22 to 25

as probes for determining the cytosine methylation state and/or single nucleotide polymorphisms (SNPs) of a corresponding genomic DNA by analysis of a chemically pretreated genomic DNA according to claim 2.

32. Use of a pretreated genomic DNA according to claim 22 for the determination of the methylation status of a corresponding genomic DNA and/or detection of single nucleotide polymorphisms (SNPs).

33. A method for manufacturing an arrangement of different oligomers or peptide nucleic acid (PNA)-oligomers (array) for analyzing diseases associated with the corresponding genomic methylation status of the CpG dinucleotides within one of the Seq. ID 32 to Seq. ID 75 and sequences complementary thereto , wherein at least one oligomer according to any of the claims 22 to 26 is coupled to a solid phase.

34. An arrangement of different oligomers or peptide nucleic acid (PNA)-oligomers (array) obtainable according to claim 33.

35. An array of different oligonucleotide- and/or PNA-oligomer sequences as recited in Claim 34, characterized in that these are arranged on a plane solid phase in the form of a rectangular or hexagonal lattice.

36. A DNA/PNA array for the analysis of prostate cell proliferative disorders associated with the methylation state of genes comprising at least one nucleic acid according to one of the preceeding claims.

37. An array as recited in any of the Claims 34 to 36, characterized in that the solid phase surface is composed of silicon, glass, polystyrene, aluminium, steel, iron, copper, nickel, silver, or gold.

38. Use of a method according to one of Claims 1 through 21 for the characterisation, classification, diagnosis and differentiation of colon cell proliferative disorders.

39. A kit comprising a bisulfite (= disulfite, hydrogen sulfite) reagent as well as oligonucleotides and/or PNA-oligomers according to one of the Claims 22 to 29.

40. Use of a pretreated genomic DNA according to claim 22 for the characterisation, classification, diagnosis and differentiation of colon cell proliferative disorders.

Fig 1

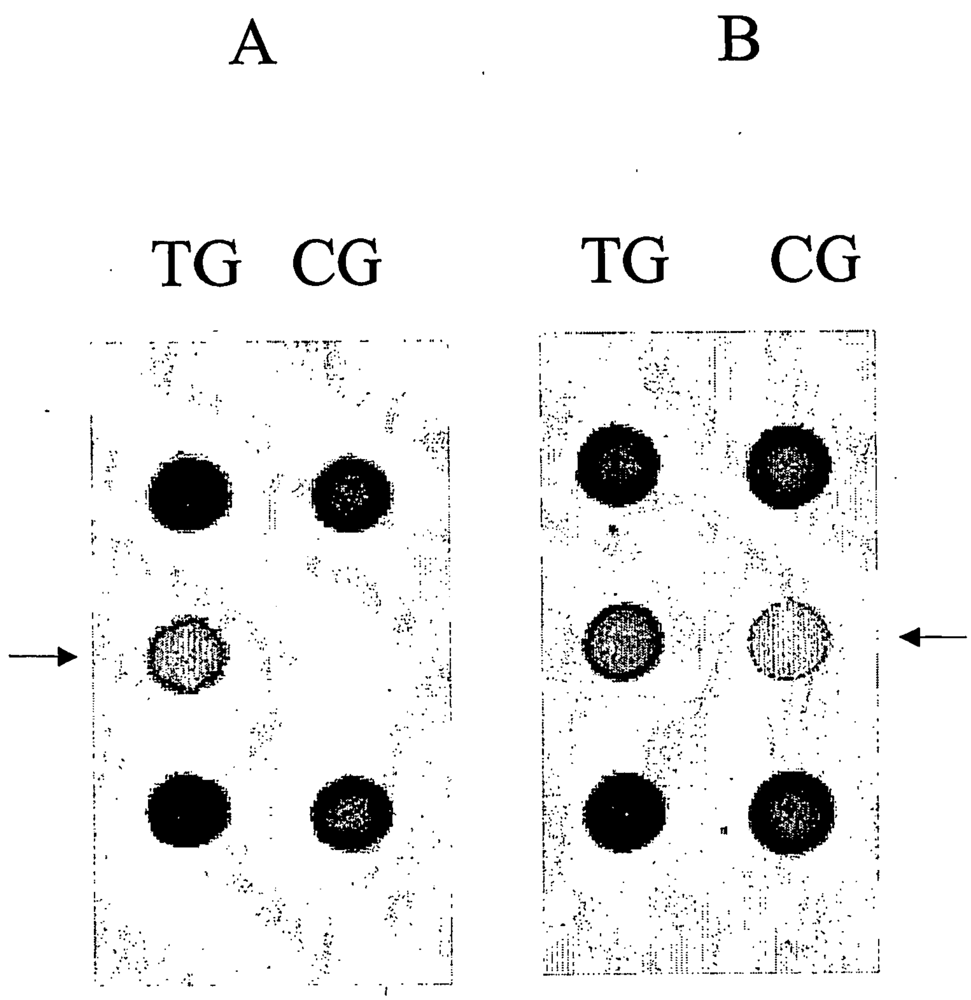
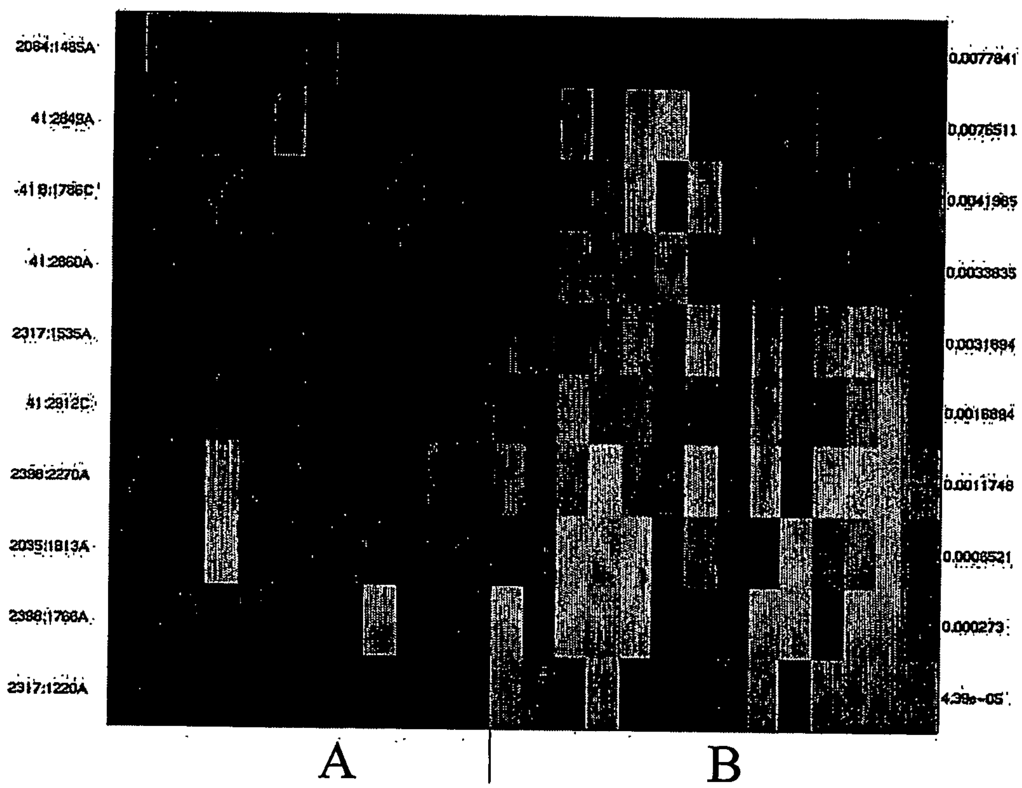


Fig 2


2064:1485A
41:2848A
418:1786C
41:2860A
2317:1535A
41:2912C
2388:2270A
2035:1813A
2388:1768A
2317:1220A
0,0077841
0,0076511
0,0041985
0,0033835
0,0031694
0,0016894
0,0011748
0,0008521
0,000273
4.39e-05
A
B

Sequence listing

<110> Epigenomics AG

<120> Method and nucleic acids for the analysis of colon cancer

<160> 527

<210> 1
<211> 3315
<212> DNA
<213> Homo Sapiens

<400> 1

cccctcactc cccactgcca ttcatccagc gctgtgcagt agcccagctg cgtgtctgcc 60
gggaggggct gccaagtgcc ctgcctactg gctgcttccc gaatccctgc cattccacgc 120
acaaacacat ccacacactc tctctgccta gttcacacac tgagccactc gcacatgcga 180
gcacattcct tccttccttc tcactctctc ggcccttgac ttctacaagc ccatggaaca 240
tttctggaaa gacgttcttg atccagcagg gtaggcttgt tttgatttct ctctctgtag 300
ctttagcatt ttgagaaagc aacttacctt tctggctagt gtctgtatcc tagcagggag 360
atgaggattg ctgttctcca tggggtatg tgtgtgtctc cttttctttt caggacttgt 420
aggattcttt gtgccatttg catataattt ggcaggttca catttttttaa gagccctatg 480
aagtgctttt tgcatgtgtt ttaaaaggc atttgaaaat tgaaagtgtg atttatggaa 540
attaaatcat ctgtaaaaaa ttgctttgga aagtaatgat tgctggccat aaagggaaat 600
atctgcgatg cacctaatgt gtttttaacc ctttatttgc tgacaatcta tagtcattaa 660
tgctaaactc gattttggct tcagctacat ttgcatattg tccaacaatg gtctattttt 720
gtaagaatta gataaaatgt atacttgata taaaatagtc aaaaatgtaa ctcttagtaa 780
cagtaagctt ggcatttaga tagaccatga acacttcgtc agatactctg ttgggtgttt 840
gggatagcaa ttaaaacaaa gtattgatag ttgtatcaga gtctattagg ctgcagcaaa 900
ggaagtttat tcaaaagtat aaactatcca agattataga cgcatgatat acttcaccta 960
ttttttgtct ccttaatatg tatatatata tatatatata tatatataca catatatgtg 1020
tgtgtgtatg tgcgtgtgca tgtttaactt ttaattcagt taaaaacttt tttctatttg 1080
tttttcatct ggatatttga ttctgcatat cctagcccaa gtgaaccgag aagatcgagt 1140
tgtaggacta aaggatagac atgcagaaat gcattttaaa aatctgttag ctggaccaga 1200
ccgacaatgt aacataattg ccaaagcttt ggttcgtgac ctgaggttat gtttggtatg 1260
aaaaggtcac atttatatt cagttttctg aagttttggt tgcataacca acctgtggaa 1320
ggcatgaaca cccatgtgcg ccctaaccaa aggtttttct gaatcatcct tcacatgaga 1380
attcctaatg ggaccaagta cagtactgtg gtccaacata aacacacaag tcaggctgag 1440
agaatctcag aaggttgtgg aagggtctat ctactttggg agcattttgc agaggaagaa 1500
actgaggtcc tggcaggttg cattctcctg atggcaaaat gcagctcttc ctatatgtat 1560
accctgaatc tccgcccccct tcccctcaga tgccccctgt cagttccccc agctgctaaa 1620
tatagctgtc tgtggctggc tgcgtatgca accgcacacc ccattctatc tgccctatct 1680
cggttacagt gtagtcctcc ccagggtcat cctatgtaca cactacgtat ttctagccaa 1740
cgaggagggg gaatcaaaca gaaagagaga caaacagaga tatatcggag tctggcacgg 1800
ggcacataag gcagcacatt agagaaagcc ggcccctgga tccgtctttc gcgtttattt 1860
taagcccagt cttccctggg ccacctttag cagatcctcg tgcgcccccg cccccctggcc 1920
gtgaaactca gcctctatcc agcagcgacg acaagtaaag taaagttcag ggaagctgct 1980
ctttgggatc gctccaaatc gagttgtgcc tggagtgatg tttaagccaa tgtcagggca 2040
aggcaacagt ccctggccgt cctccagcac ctttgtaatg catatgagct cgggagacca 2100
gtacttaaag ttggaggccc gggagcccag gagctggcgg agggcgttcg tcctgggact 2160
gcacttgctc ccgtcgggtc gcccggcttc accggacccg caggctcccg gggcagggcc 2220
ggggccagag ctcgcgtgtc ggcgggacat gcgctgcgtc gcctctaacc tcgggctgtg 2280
ctctttttcc aggtggcccg ccggtttctg agccttctgc cctgcgggga cacggtctgc 2340
accctgcccg cggccacgga ccatgaccat gaccctccac accaaagcat ctgggatggc 2400
cctactgcat cagatccaag ggaacgagct ggagcccctg aaccgtccgc agctcaagat 2460
ccccctggag cggcccctgg gcgaggtgta cctggacagc agcaagcccg ccgtgtacaa 2520
ctaccccgag ggcgccgcct acgagttcaa cgccgcggcc gccgccaacg cgcaggtcta 2580
cggtcagacc ggcctcccct acggccccgg gtctgaggct gcggcgttcg gctccaacgg 2640
cctgggggggt ttcccccccac tcaacagcgt gtctccgagc ccgctgatgc tactgcaccc 2700
gccgccgcag ctgtcgcctt tcctgcagcc ccacggccag caggtgccct actacctgga 2760

```
gaacgagccc agcggctaca cggtgcgcga ggccggcccg ccggcattct acaggtaccc    2820
gcgcccgcgc cgcccgtcgg ggtggccgcc gcgcccggca ggagggaggg agggagggag    2880
ggagaaggga gagcctaggg agctgcggga gccgcgggac gcgcgacccg agggtgcgcg    2940
cagggagccc ggggcgcgcg gcccagcccg ggggttctgc gtgcagcccg cgctgcgttc    3000
agagtcaagt tctctcgccg ggcagctgaa aaaaacgtac tctccaccca cttaccgtcc    3060
gtgcgagagg cagacccgaa agcccgggct tcctaacaaa acacacgttg gaaaaccaga    3120
caaagcagca gttatttgtg ggggaaaaca cctccaggca aataaacacg gggcgctttg    3180
agtcacttgg gaaggtctcg ctcttggcat ttaaagttgg gggtgtttgg agttagcaga    3240
gctcagcaga gttttattta tccttttaat gtttttgttt aatgtgctcc ccaaatttcc    3300
tttcatctag actat                                                     3315
```

<210> 2
<211> 7369
<212> DNA
<213> Homo Sapiens

<400> 2

```
cagaagtcct cccttagagt gtgtctgggt acacattcaa gtgcatggtt gcaaactttt      60
tttttaaag cactgaatag tactagacac ttagtaggta cttaagaaat attgaatgtc      120
gtggtggtgg tgagctagaa gttataaaaa aaattctttc ccaaaaacaa caacaaaaag     180
aattatttca ttgtgaagct cagtaccaca aaaatttaaa taattcatta caagccttta     240
ttaaaaaaaa ttttctcccc aaagtaaaca gacagacaat gtctagtcta tttgaaatgc     300
ctgaaagcag aggggcttca aggcagtggg agaaggtgcc tgtcctctgc tggacatttg     360
acaaccagcc ctttggatgg tttggatgta taggagcgaa ggtgcagaca gcagtggggc     420
ttagagtggg gtcctgaggc tgtgccgtgg cctttctggg gtttagccac aatcctggcc     480
tgactccagg gcgaggcagg ccaagggggt ctgctactgt gtcctcccac ccctacctgg     540
gctcccatcc ccacagcaga ggagaaagaa gcctgtcctc cccgaggtca gctgcgttag     600
aggaagaaga ctgggcatgt ctgggcagag atttccagac tctgagcagc ctgagatgtc     660
agtaattgta gctgctccaa gcctgggttc tgtttttag tgggatttct gttcagatga      720
acaatccatc ctctgcaatt ttttaaaagc aaaactgcaa atgtttcagg cacagaaagg     780
aggcaaaggt gaagtccagg ggaggtcagg ggtgtgaggt agatgggagc ggatagacac     840
atcactcatt tctgtgtctg tcagaagaac cagtagacac ttccagaatt gtcctttatt     900
tatgtcatct ccataaacca tctgcaaatg agggttattt ggcatttttg tcattttgga     960
gccacagaaa taaaggatga caagcagaga gccccgggca ggaggcaaaa gtcctgtgtt    1020
ccaactatag tcatttcttt gctgcatgat ctgagttagg tcaccagact tctctgagcc    1080
ccagtttccc cagcagtgta tacgggctat gtggggagta ttcaggagac agacaactca    1140
ctcgtcaaat cctccccttc ctggccaaca aagctgctgc aaccacaggg atttcttctg    1200
ttcaggtgag tgtagggtgt agggagattg gttcaatgtc caattcttct gtttccctgg    1260
agatcaggtt gcccttttt ggtagtctct ccaattccct ccttcccgga agcatgtgac     1320
aatcaacaac tttgtatact taagttcagt ggacctcaat ttcctcatct gtgaaataaa    1380
cgggactgaa aaatcattct ggcctcaaga tgctttgttg gggtgtctag gtgctccagg    1440
tgcttctggg agaggtgacc tagtgaggga tcagtgggaa tagaggtgat attgtggggc    1500
ttttctggaa attgcagaga ggtgcatcgt ttttataatt tatgaatttt tatgtattaa    1560
tgtcatcctc ctgatctttt cagctgcatt gggtaaatcc ttgcctgcca gagtgggtca    1620
gcggtgagcc agaaaggggg ctcattctaa cagtgctgtg tcctcctgga gagtgccaac    1680
tcattctcca agtaaaaaaa gccagatttg tggctcactt cgtggggaaa tgtgtccagc    1740
gcaccaacgc aggcgaggga ctgggggagg agggaagtgc cctcctgcag cacgcgaggt    1800
tccgggaccg gctggcctgc tggaactcgg ccaggctcag ctggctcggc gctgggcagc    1860
caggagcctg ggccccgggg agggcggtcc cgggcggcgc ggtgggccga gcgcgggtcc    1920
cgcctccttg aggcgggccc gggcggggcg gttgtatatc agggccgcgc tgagctgcgc    1980
cagctgaggt gtgagcagct gccgaagtca gttccttgtg gagccggagc tgggcgcgga    2040
ttcgccgagg caccgaggca ctcagaggag gtgagagagc ggcggcagac aacaggggac    2100
cccgggccgg cggcccagag ccgagccaag cgtgcccgcg tgtgtccctg cgtgtccgcg    2160
aggatgcgtg ttcgcgggtg tgtgctgcgt tcacaggtgt ttctgcggca ggtgaatgac    2220
gggcgtgggt cggtgcgcgc tcggcttgcg cacacggtgt ctctaagtgc gcgggtgacg    2280
agagtcggga tgtgccggag accccggggc ggagagcggg attacaagta caggaatccc    2340
tggtcacgct ccccgcccct ggaaacccag ctggggcgag ggagggcgtg gacgggaccg    2400
ttctgggagc tcgcctttgg ctgcggttgg ctccaggccc caggcgcagt ttgctcgcgg    2460
cgtggggatg aagtccgtgt ccctggaggg gcccaggaag ggcgaggaaa gcggagtgga    2520
gtaagttcgt ctaggatcgg tcccgggtgg ctctgggatc caatctgcgc cgccctggcc    2580
caggtcccag gttcaggtcc tttacgccac tgtgtccacc acctggctga gcgctgaggt    2640
cagcgcgggc tgtttcctgg cccttgggaa tgtgccagga cccgtcccct aaggactagc    2700
```

gaggaggtga ctcactgtga caaggagacc ccagggaacg gactgtatga ggtcagaacc 2760
ccgcccggga tggggtacag cgggactcca gaagccctct cccctgcccc ttcgcggtct 2820
ccgtcctccc atcggcacag tgacctattt ggctggaaca gtttgttccc aaggaagccg 2880
ggcactggag gtccgggaca ccgcgtcggg tccccgctcc gcggcgcgct gtaggggtcg 2940
gggagtcacg gccctgctct gggcgggctc taaccagcct gtcagtcggg gaagggcaag 3000
ggtctcctct acctctttcc caccgcggcc gggagaatcg cggcccagcc tgtcctcggg 3060
tcggggcgct ggactccggg gcgggagcgg agcccacgcc tggatgggag gcggggaggg 3120
ttcatgtctt tgaggggtgg ggggtctggg gggcacgacg ctgctcaggg cctctatcag 3180
ctgcctcggg ggctcagggc ttcccgacct agcccagatt ccctctccga aagctacagg 3240
gctgagcgga gcaggggggc gagtcgcccc ctggggcgcc gccgcctggc gcggaccaca 3300
gcgcgtcctc tccgtcccaa accccctgggg gacacttgcg ccctcttcgt gaggaaaagc 3360
atcttggagc tgggttagga acttggggcg cccaggcagc ttcccctctc cttgcctccc 3420
tccacgtcgc gtttctggga ggacttgcga gcggttttgt tttcgttgct cccgtctatt 3480
tttattttcc agggatctga ctcatcccgt gctttgggcg tggagataag gtggaggggc 3540
cggctcccgg cgcgcgcgcg cgtgcgtgtc tgcgcgggcg tgtgtgtgtg tgtgtgtgtg 3600
tgtgtgtgtg tgtgtgtctg tgtcagagac ggcacaagag cgcgcggttt cccaacagcg 3660
gcgggagttt cggaagcctg gccggctcag cgtgacgtgt tcgcggcccc ccggtcccct 3720
cccattctcc ccctccccac cccagggtga cgcgcagccg gagtggaagc agttttggcg 3780
ggcgagcagc gccttgcagg aaactgactc atcactactc cctccagcgg tccgaggctc 3840
tgcccacgca cctcccactc cgcgcgtgat ttcctggagg ccggcgcccc ctcccggccc 3900
tggcgggaat agcacacagg ctttcccgcg gagtggggct ggccggcgcg aaccgccgcg 3960
gctactcctg ggctcatccg agatcaaccc ctatgccatt accacccctt caaaggagca 4020
ctccttaggt tcaacagtat tcactgagct cttactggaa attaaaatat ggctgaagtc 4080
taaggcagga aggccaataa aggaggctat ttttaattgt ttctaaaaca agggtttgcg 4140
tttctgagtt ttctttgggc tgaaagttat tatgagcatg agagcagatt ttgatggggg 4200
aggagaggcc tatgagagcc ataagagaag gaggggtggt agaagaggag agggtgcctg 4260
cctagatcct agtcctgtct tgaactcccg agagccaggg aatatccagc accttgatga 4320
agccctaggc gggcgcctcc tccttgtgcc tatgatgtat tgagacccag aatgtccatt 4380
tcaaacatac cagtgtgtct ccgcttggct ggcaacccaa gagtgcccat ctgaggaatt 4440
gtgccaaaca cttgcttgaa tcttcaatct ggattaagtt ggtctcggga ggcagggcct 4500
cagcaatcta tattttgaaa aaactcccta ggtgcttttc tttctttctt tttttctttc 4560
tttctttctt tctttctttc tttctttctt tctttctttc tttcttttc tttctttctt 4620
tctttttctt tcttttcttt ctttctttct ttctttcttt ctttctttct ttctttcttc 4680
ctttctcttt ctctctttct ttctctttct ctctttcttt cttttctttc gacagagttg 4740
cactctgtca cccaggctgg agtgcaatgg caccatcctg gactcaagta gtcctcctgt 4800
ttcagcctcc caagtaaccg ggaccacagg cgtgatcccc ccgcccccat gcccagattt 4860
tttttttttt tttttttttt ttgagatgcg gtctcgctct gtcacccagg ctggagtgca 4920
gtggcgtgat ctcggctcac tgcaagctcc gcctcccggg ttcacgccat tctcctgcct 4980
cagcctcccg agtagctggg actacaggtg ctgccatcat gcccggctaa tttttttttg 5040
tatttttagt agagacgggg tttcaccgtg ttagccagga tggtctcaat ctcctgacct 5100
cgtgctccgc cctcctcggc ctcccaaagt gctgggatta caggtgtgag acactgcacc 5160
caaccaccca gctaattttt atttattttt atttttagta gagacagggt ctcagctagt 5220
tgcccaggct agtcttggac ccttgggctc aaatgattct cccacctctg cctcccagag 5280
tattaggatt acaggcataa gccactgccc ctggcctccc caagtgattg tgatgggcct 5340
ctctggttaa gaaacctcaa aattagagag ggagtggggt tcaatactac agcacaggac 5400
tcagggcaaa caggcctggg ttcagatcct ggctgtgcca cttatgaact gtgtgatgtt 5460
aggcaagtta cttaacttat ctgagccttg gttgcctctt ctgtaaaaag ggagctaata 5520
gatatccact ttttaggagg attgatattt ttaaactgct tagaacagcc cccaaacata 5580
aaaatatata aataaatccc aactcatgcc tagcagaggg tggatagagg ttatttgagg 5640
gctctgtcca ctgtactggg tgaccccttt atggggcagt ggcctttggc ctttttagct 5700
gtatgactca ggggcaagtc tcatatctct tccatctcct gccctttaaa cttggtgtga 5760
agttaccaag agcctcctct cccaaccagc tgggacgtga aactgtgggc tccactgatc 5820
acaagcagtg gggtgaggtg gggtggagca gatgtggcat gtgtcccggg cttcctgcct 5880
catgaggact cagcagagct ttcacccccca gaaactgcaa gttgggactt gtccctagga 5940
aaatccagtt gctgccaagg tcgtgcagtc actcagccct ggagtcaagc cagagcaggc 6000
aggtaggtgc cagggctccc tcatgggcaa actcactctc cgttttccct ctcctgaagg 6060
gggaggagag gagccaggta gaccagccac ctttaatttt ctttttgcct gcaaaacggt 6120
ttccttggac acaggcaaca cgaggcaggg gctgccaggt gtctagactt cagatcacct 6180
gatgtgcctg gcaggatgtg gctcagcctg ggagaaatca tcccttgcgc tgccccgccc 6240
ggcccctcct taccccctagg ccacccgcct gacgacatcc ttgggaaagg ccctcagcct 6300
acagcacctg tcagctgctg tctgaaggag gtagttggca gggggaagtg ataggggggga 6360
ggctcagtaa aactgaaggc agagaggaat aatcatactt ctgttttcaa tgcacttctc 6420
tatacgaagt gctgctggca cgttacctac attaactcag ttaattctca tgtctatcct 6480

ctgagacagt cactattact atccccattt tatagatgag gaaactagag ctcagacaag 6540
ttaagttgct tgcccagggt cacctagtaa aacctggact ccagcccagg tgatctggct 6600
ccagagccct cctgcttaac caccaggata cagcctttca ttcagctctg ttctgtctgc 6660
cttgctgcat ggactctgtg atcaatttct tgagtatgtg tctgtagcca tgctctttaa 6720
acttgtacat ggccccattt atggatgagg aaactgagac ctagagacat taagtggctt 6780
tttaaagctt acgtagtaac tggcagagct aggaccacaa cccgggtgct ttttgcccca 6840
aagtcccggg tacttttact tggcagagca gggttaccct acttggggat ctgggtcggg 6900
ggacttagga ggctggagga actgtcagac tgtttcttct tttgggaatt gaccttctgg 6960
ccagggctgc gattaggaaa ctgctggact ctggcaattc acacatattt gggggggcatt 7020
cacacccatg agggacacct ctggggggaa aacaaattga ttttagctga taatacctgg 7080
tggcaaacag gaccctggtc cttgctcttg caatagactt gcctttgttg acattagctt 7140
gcccttcagt tgcctgctct cccagtgacc ttggtgtgcc aggctggctg agctctgctg 7200
gtgggggtca ggcctcctgt gggaaggaag caggaagacc agctggaagg agtgagagag 7260
accctctggt aggaagacgt cacctgaggt gacacagcaa agcccggcca ggtaacatag 7320
tgtctaatct ccgccgtgac cagggccttc cttgtatctc tgctgcagg 7369

<210> 3
<211> 2986
<212> DNA
<213> Homo Sapiens

<400> 3

gagggtccct tccagctgtc acattctgga gcgtatgaga tgaggtaggc acacaaagtg 60
gacaagatgt ggctaagaaa acaagctaca catcaagctc atctgtagca taggtgctta 120
agaaaacttt gctgctgtgt aatattagaa cggaaggttg gtttccagta aaatgcatta 180
actttggctc aaaccaagat gatgggtacc gggcatgggg gtggggaggc agttgaagat 240
ccactgagct ttgtctcagg gcagccctgc tcatcgtcct actttacctt ccaccacggt 300
gctcaagccc acactgagag agaaatttcc agctgcaaaa gggagaagag aaacgctgga 360
atactagtat cggacgttag gacatggttg tggtgtttta aaaatcattt catcatctgg 420
agtttgaccc cgaggggagt attttcaccc ttcagccctc tgaaagcatt cactagcatc 480
tgaatattgt tctgagtttg ttggagcagt gaaatctggt gagagagaag ggtggaggaa 540
ggaaggagct gttgtatttg gcggctggac tcaggtagag gaaactgcta caatcccggg 600
aaagaacaga aaagtagaaa gggacgagtt cccacacgca gccaatgtcc atggccttaa 660
ctgtgcttgg gaaggaagat cctgggccag ggtgtaccc tcgtttttca aaactaaacg 720
tgtctgagac agctacaaag tttattaagg gacttgagag actagagttt tttgtttttt 780
tttttaatc ttgagttcct ttcttatttt cattgaggga gagcttgagt tcatgataag 840
tgccgcgtct actcctggct aatttctaaa agaaagacgt tcgctttggc ttcttcccta 900
ggcccccagc ctccccaggg atggcagaaa cttctgggtt aaggctgagc gaaccattgc 960
ccactgcctc caccagcccc cagcaaaggc acgccggcgg gggggcgccc agccccccca 1020
gcaaacgctc cgcggcctcc cccgcagacc acgaggtggg ggccgctggg gagggccgag 1080
ctgggggcag ctcgccaccc cggctcctag cgagctgccg gcgaccttcg cggtcctctg 1140
gtccaggtcc cggcttcccg ggcgaggagc gggagggagg tcggggctta ggcgccgcgg 1200
cgaacccgcc aacgcagcgc cgggccccga acctcaggcc ccgccccagg ttcccggccg 1260
tttggctagt ttgtttgtct taattttaat ttctccgagg ccagccagag caggtttgtt 1320
ggcagcagta cccctccagc agtcacgcga ccagccaatc tcccggcggc gctcggggag 1380
gcggcgcgct cgggaacgag gggaggtggc ggaaccgcgc cggggccacc ttaaggccgc 1440
gctcgccagc ctcggcgggg cggctcccgc cgccgcaacc aatggatctc ctcctctgtt 1500
taaatagact cgccgtgtca atcattttct tcttcgtcag cctcccttcc accgccatat 1560
tgggccacta aaaaaagggg gctcgtcttt tcggggtgtt tttctccccc tcccctgtcc 1620
ccgcttgctc acggctctgc gactccgacg ccggcaaggt ttggagagcg gctgggttcg 1680
cgggacccgc gggcttgcac ccgcccagac tcggacgggc tttgccaccc tctccgcttg 1740
cctggtcccc tctcctctcc gccctcccgc tcgccagtcc atttgatcag cggagactcg 1800
gcggccgggc cggggcttcc ccgcagcccc tgcgcgctcc tagagctcgg gccgtggctc 1860
gtcggggtct gtgtcttttg gctccgaggg cagtcgctgg gcttccgaga ggggttcggg 1920
ctgcgtaggg gcgctttgtt ttgttcggtt ttgttttttt gagagtgcga gagaggcggt 1980
cgtgcagacc cgggagaaag atgtcaaacg tgcgagtgtc taacgggagc cctagcctgg 2040
agcggatgga cgccaggcag gcggagcacc ccaagccctc ggcctgcagg aacctcttcg 2100
gcccggtgga ccacgaagag ttaacccggg acttggagaa gcactgcaga gacatggaag 2160
aggcgagcca gcgcaagtgg aatttcgatt ttcagaatca caaaccccta gagggcaagt 2220
acgagtggca agaggtggag aagggcagct tgcccgagtt ctactacaga cccccgcggc 2280
cccccaaagg tgcctgcaag gtgccggcgc aggagagcca ggatgtcagc gggagccgcc 2340
cggcggcgcc tttaattggg gctccggcta actctgagga cacgcatttg gtggacccaa 2400

agactgatcc gtcggacagc cagacggggt tagcggagca atgcgcagga ataaggaagc 2460
gacctgcaac cgacggtaat gaccctttcc caaccataga atgtgtttgg ggccccgctt 2520
tgcctgctgg agggtgttaa ccttagcttg cttttcggcg tattctgatt tagctttggg 2580
agagctaact ttattggtct taggtgttca gtgctacctg gcccactgct tgtctgtttg 2640
tgacttttaa gtcagaaact ggagatggta agatccgata atttccctaa cttaatacat 2700
cgcggtccct ctcactagca actcctaggt atgtgacaaa gttgggatgt ttatcaacgg 2760
tccgcctcct ggctagggaa agagctctgg ggcggagaat gcactttctg tttttttgaaa 2820
acaacctcat tttgtgccct taaaagccac tggggatgac ggatccagga ttgtgggtgg 2880
aggtagtggg tttttcatcc cctgactatg gggccaactt ctgccagcca ttgttttttc 2940
taataaagat tgtgtgttct ttttaaaaat ttcccctgcg cttaga 2986

<210> 4
<211> 5666
<212> DNA
<213> Homo Sapiens

<400> 4

aaaattagaa cttttacctc cttgcgcttg ttatactctt tagtgctgtt taacttttct 60
ttgtaagtga gggtggtgga gggtgcccat aatcttttca gggagtaagt tcttcttggt 120
ctttctttct ttctttcttt cttttttttct tgagaccaag tttcgctctt gtctcccagg 180
ctggagtgca atggcgcgat ctcggctcac tgcaacctcc gccttctcct gggttcaagc 240
gattctccta catcagcctc cgagtagctg ggattacagg catgcgccac caagccccgc 300
taattttgta tttttagta gagacagggt ttcgccatgt tggtcaggct tgtctcgaac 360
tcctggcctc aggtgatccg cctgtctcgg cctcccagaa tgctgggatt atagacgtga 420
gccaccgcat ccggactttc cttttatgta atagtgataa ttctatccaa agcatttttt 480
ttttttttg agtcggagtc tcattctgtc acccaggctg gagggtggtg gcgcgatctc 540
ggcttactgc aacctctgcc tcccgggttc aagcgattct cctgcctcag cctcctgagt 600
agctggaatt acacacgtgc gccaccatgg ccagctaatt tttgtatttt tagtagagac 660
ggggtgtcac cattttggcc aagctggcct cgaactcctg acctcaggtg atctgcccgc 720
ctcggcttcc caaagtgctg ggattacagg tgtgagccac cgcgtcctgc tccaaagcat 780
tttctttcta tgcctcaaaa caagattgca agccagtcct caaagcggat aattcaagag 840
ctaacaggta ttagcttagg atgtgtggca ctgttcttaa ggcttatatg tattaataca 900
tcatttaaac tcacaacaac ccctataaag caggggcac tcatattccc ttcccccttt 960
ataattacga aaaatgcaag gtattttcag taggaaagag aaatgtgaga agtgtgaagg 1020
agacaggaca gtatttgaag ctggtctttg gatcactgtg caactctgct tctagaacac 1080
tgagcacttt ttctggtcta ggaattatga ctttgagaat ggagtccgtc cttccaatga 1140
ctccctcccc atttcctat ctgcctacag gcagaattct cccccgtccg tattaaataa 1200
acctcatctt ttcagagtct gctcttatac caggcaatgt acacgtctga gaaacccttg 1260
ccccagacag ccgttttaca cgcaggaggg gaaggggagg ggaaggagag agcagtccga 1320
ctctccaaaa ggaatccttt gaactagggt ttctgactta gtgaaccccg cgctcctgaa 1380
aatcaagggt tgagggggta gggggacact ttctagtcgt acaggtgatt tcgattctcg 1440
gtggggctct cacaactagg aaagaatagt tttgcttttt cttatgatta aaagaagaag 1500
ccatactttc cctatgacac caaacacccc gattcaattt ggcagttagg aaggttgtat 1560
cgcggaggaa ggaaacgggg cgggggcgga tttcttttta acagagtgaa cgcactcaaa 1620
cacgcctttg ctggcaggcg gggagcgcg gctgggagca gggaggccgg agggcggtgt 1680
ggggggcagg tggggaggag cccagtcctc cttccttgcc aacgctggct ctggcgaggg 1740
ctgcttccgg ctggtgcccc cgggggagac ccaacctggg gcgacttcag gggtgccaca 1800
ttcgctaagt gctcggagtt aatagcacct cctccgagca ctcgctcacg gcgtcccctt 1860
gcctggaaag ataccgcggt ccctccagag gatttgaggg acagggtcgg agggggctct 1920
tccgccagca ccggaggaag aaagaggagg ggctggctgg tcaccagagg gtggggcgga 1980
ccgcgtgcgc tcggcggctg cggagagggg gagagcaggc agcgggcggc ggggagcagc 2040
atggagccgg cggcggggag cagcatggag ccttcggctg actggctggc cacggccgcg 2100
gcccggggtc gggtagagga ggtgcgggcg ctgctggagg cgggggcgct gcccaacgca 2160
ccgaatagtt acggtcggag gccgatccag gtgggtagag ggtctgcagc gggagcaggg 2220
gatggcgggc gactctggag gacgaagttt gcaggggaat tggaatcagg tagcgcttcg 2280
attctccgga aaaagggag gcttcctggg gagttttcag aaggggtttg taatcacaga 2340
cctcctcctg gcgacgccct gggggcttgg gaagccaagg aagaggaatg aggagccacg 2400
cgcgtacaga tctctcgaat gctgagaaga tctgaagggg ggaacatatt tgtattagat 2460
ggaagtatgc tctttatcag atacaaaatt tacgaacgtt tgggataaaa agggagtctt 2520
aaagaaatgt aagatgtgct gggactactt agcctccaat tcacagatac ctggatggag 2580
cttatctttc ttactaggag ggattatcag tggaaatctg tggtgtatgt tggaataaat 2640
atcgaatata aattttgatc gaaattattc agaagcggcc gggcgcggtg cctcacgcct 2700

```
tgtaatccct tcactttggg agatcaaggc gggggaatc acctgaggtc gggagttcga   2760
gaccagcctg gccaacaggt gaaacctcgc ctctactaaa aatacaaaaa gtagccgggg   2820
gtggtggcag gcgcctgtaa tcccagctac tcgggaggtt gaggcaggag aatcgcttga   2880
acccgggagg ctgaggttgt agtgaacagc gagatggagc cacttcactc cagcctgggt   2940
gacagagtga gactttgtcg aaagaaagaa agagagaaag agagagagaa aaattattca   3000
gaagcaacta catattgtgt ttatttttaa ctgagtaggg caaataaata tatgtttgct   3060
gtaggaactt aggaaataat gagccacatt catgtgatca ttccagaggt aatatgtagt   3120
taccattttg ggaatatctg ctaacatttt tgctctttta ctatctttag cttacttgat   3180
atagtttatt tgtgataaga gttttcaatt cctcattttt gaacagaggt gtttctcctc   3240
tccctactcc tgttttgtga gggagttagg ggaggattta aaagtaatta atacatgggt   3300
aacttagcat ctctaaaatt ttgccaacag cttgaacccg ggagtttggc tttgtagtcc   3360
tacaatatct tagaagagac cttatttgtt taaaaacaaa aaggaaaaag aaaagtggat   3420
agttttgaca atttttaatg gagaagggag aagaacatgt agaaaagggg aaatgatgtt   3480
ggcttagaat cctaactaca ttggtgttta atataggaac atttatttat ataacatttt   3540
aaagtactaa attcatatta gtatattatc aaatggatat attatcaaat gggtttaagc   3600
atcctacaca ttttaattca attgattcat tttcttttg ctttggattt ctatcatgat   3660
ttaaatattt acatatgggt tactttttag atttttcata ctatgaaata taagaaaaac   3720
ctttaaggct agttttatga ccaagacgaa ggacttcatt gaatacacaa aacaataaat   3780
atactgcaac attttgtctt tctttttgta gctgcaattt ggtttgctta tactttctct   3840
ttgtctcttt gaaaactgag tcagtttcac tttctcagga caggatttaa taaccataat   3900
ataatttagt ataattcctt gatttaggca aattatgcaa tttgtgttta gtatgaaatg   3960
tacctaaaaa taagtaactc ctctttaaca ccaccatcct caaactaata taacaaataa   4020
cagttatcct aaaataaatt gtctacttcc accatgcagc actcaaattt taaggttgct   4080
atgactgcag acagtatttt aaaattcctc tctggaaatg gctttgtttc caagatgatt   4140
taggaaccaa agaggtgacc atctcttgtt taatgaactc tcaaatcata aacctgggaa   4200
gtgttttagt ttcctactgc tgctgttaca aattatcaca aatgtgttag ctaaaacaaa   4260
cacaaaatta ttattttaca gttctagaga tcagaagtca aaaatgggtc cacaaggttt   4320
cattcctttt ggaaactcta aggggcaatc tgtttccttg tcttttccag cttctagtga   4380
ccatcaaatt ccttggctca tggtctctgt attttctctg tggcctgtgc ttccattctt   4440
gtatcttctc tctgactgtg accctctaat aaaaacactt ggggttatgt tgggcccacc   4500
ctgaaaattc tggataatct ccctcaagac cattaattaa atcacatctg caaagcctct   4560
tttgccacat aagttaatgt attaaaagtt tttgaggatt aggacataga cattgggggt   4620
gggggggcat tattcagcct accacaggaa ggaattttag ggttaattaa actagccttc   4680
ttattttata cttgaagaaa ttgaagtttt ggaattggag agcattatgc taaatgaaat   4740
aagccaaaca cagaaagaca aatatcacat gttctcactt atctgtgaaa tataaaacaa   4800
ttacattctt agcagtaaag agtagaatgg tggttactag agctgggggg tgggaggaat   4860
ggggagatgg taatcaagat ataaagcctc agttaagatg ggaggaataa gtttgattgt   4920
tttttttgag atgtgtttca tagcatgatg aatatagcta aatagtaaat cccaaatgct   4980
ctcatttgac aaaaatgtca aatatttgag atgatggata ggttacttag cttgacttaa   5040
taattcccca ttgtgttcaa agatcataac ttcatattgt accacataaa tatatacaac   5100
tgtactatcc caatatataa ttttaaaact aatataatga aaaagaaatt gaagttcaac   5160
attcccagaa gctaagtgta acttaaaagt tttgtgagaa tttgttttaa caaacaaaca   5220
agtttctctt ttttaacaat taccacattc tgcgcttgga tatacagcag tgaacaaaaa   5280
aaaaaaaaaa aaaaaaaatc tccaggccta acataatttc aggaagaaat ttcagtagtt   5340
gtatctcagg ggaaatacag gaagttagcc tggagtaaaa gtcagtctgt ccctgcccct   5400
ttgctatttt gcccgtgcct cacagtgctc tctgcctgtg acgacagctc cgcagaagtt   5460
cggaggatat aatggaattc attgtgtact gaagaatgga tagagaactc aagaaggaaa   5520
ttggaaactg gaagcaaatg taggggtaat tagacacctg ggcttgtgt ggggtctgc   5580
ttggcggtga gggggctcta cacaagcttc ctttccgtca tgccggcccc caccctggct   5640
ctgaccattc tgttctctct ggcagg                                          5666
```

<210> 5
<211> 5085
<212> DNA
<213> Homo Sapiens

<400> 5

```
tgatggttgc acaactctga gtacatgaaa aatcaatgaa ctgatacttt gagtgagctg     60
tatgatactg gaattacacc tcaataaagc atggtaactg ttttaagata ggctggaaag    120
agaaagcctg aaaacaacaa taatgatatt aataaattag tttacttctc tagtctcata    180
tacttctgtg cccacacttg ctcctgttct attcataatg gtccccttgc agttgccata    240
ttatatcctg ccatttgatg cccggtgaac attctatacc tgcttcccag aattctcttt    300
```

```
acctttcctc tatctgccta acttccacat atctaaaatt aatcagagta aactatttac     360
tagaacaacc aactccaaat cctagtaacc taacatgata aaggtttgtt tctcactcat     420
atagcccctc cccagatgat cgaggggtcc aggctcctta cctctagtgg ctcccccacc     480
ttctggagtc ttctgcattc tttatacatg gttgagataa actatgagtc attagcacag     540
ctagaccttg aggtcctaca agaaaatttg caaatcattc actctgtttt gaacaaggta     600
tatttaagat gatgttaaaa tacccaatgg tcttgggtca aatacagttt atgactgtgt     660
atctaaaata tatattgcaa tattcttccc tttttctact gacttcatga atttagcggg     720
gatccatttt ataagctcaa agataattac ttttcagact aagaatattt agggtaaaaa     780
gtactgttca acatctctac tgaggatgtt atgatgtagc acactgtata agctggagct     840
aaaggaaact ttccttaaag tgctatttac taaaaattgg aacacattcc ttaagacaaa     900
tcgaagtgtg gcacacaaca tccaaacttc catcatagat acagaggtgt taccatctcc     960
cactcccaaa tttctttgtc acgctgagga tactcaagag gagcaggaca tgttggtcgc    1020
agcaggagaa acttgaaagc attcactttt atggaactca taagggagag aatttcttat    1080
tttagtatcg tccttgatac atttattatt ttaaaagata atgtagccaa atgtcttcct    1140
ctgtgttaaa tctttacaaa actgaaatct taaaatggtg acaaaaattc tacttctgat    1200
agaatctatt catttttcca attagatagg gcataattct taatttgcaa aacaaaacgt    1260
aatatgctta tgaggttcca tcccaaagaa cctgctattg agagtagcat tcagaataac    1320
gggtggaaat gccaactcca gagtttcaga tcctaccggt aattggggta gggaggggct    1380
ttgggcgggg cctccctaga ggaggaggcg ttgttagaaa gctgtctggc cagtccacag    1440
ctgtcactaa tcggggtaag ccttgttgta tttgtgcgtg tgggtggcat tctcaatgag    1500
aactagcttc acttgtcatt tgagtgaaat ctacaacccg aggcggctag tgctcccgca    1560
ctactgggat ctgagatctt cggagatgac tgtcgcccgc agtacggagc cagcagaagt    1620
ccgacccttc ctgggaatgg gctgtaccga gaggtccgac tagccccagg gttttagtga    1680
gggggcagtg gaactcagcg agggactgag agcttcacag catgcacgag tttgatgcca    1740
gagaaaaagt cgggagataa aggagccgcg tgtcactaaa ttgccgtcgc agccgcagcc    1800
actcaagtgc cggacttgtg agtactctgc gtctccagtc ctcggacaga agttggagaa    1860
ctctcttgga gaactccccg agttaggaga cgagatctcc taacaattac tactttttct    1920
tgcgctcccc acttgccgct cgctgggaca aacgacagcc acagttcccc tgacgacagg    1980
atggaggcca agggcaggag ctgaccagcg ccgccctccc ccgcccccga cccaggaggt    2040
ggagatccct ccggtccagc cacattcaac acccactttc tcctccctct gcccctatat    2100
tcccgaaacc ccctcctcct tccctttcc ctcctccctg gagacggggg aggagaaaag    2160
gggagtccag tcgtcatgac tgagctgaag gcaaagggtc cccgggctcc ccacgtggcg    2220
ggcggcccgc cctcccccga ggtcggatcc ccactgctgt gtcgcccagc cgcaggtccg    2280
ttcccgggga gccagacctc ggacaccttg cctgaagttt cggccatacc tatctccctg    2340
gacgggctac tcttccctcg gccctgccag ggacaggacc cctccgacga aaagacgcag    2400
gaccagcagt cgctgtcgga cgtggagggc gcatattcca gagctgaagc tacaaggggt    2460
gctggaggca gcagttctag tcccccagaa aaggacagcg gactgctgga cagtgtcttg    2520
gacactctgt tggcgccctc aggtcccggg cagagccaac ccagccctcc cgcctgcgag    2580
gtcaccagct cttggtgcct gtttggcccc gaacttcccg aagatccacc ggctgccccc    2640
gccacccagc gggtgttgtc cccgctcatg agccggtccg ggtgcaaggt tggagacagc    2700
tccgggacgg cagctgccca taaagtgctg ccccggggcc tgtcaccagc ccggcagctg    2760
ctgctcccgg cctctgagag ccctcactgg tccggggccc cagtgaagcc gtctccgcag    2820
gccgctgcgg tggaggttga ggaggaggat ggctctgagt ccgaggagtc tgcgggtccg    2880
cttctgaagg gcaaacctcg ggctctgggt ggcgcggcgg ctggaggagg agccgcggct    2940
gtcccgccgg ggcggcagca ggaggcgtcg ccctggtccc caaggaagat tcccgcttct    3000
cagcgcccag ggtcgccctg gtggagcagg acgcgccgat cgtccgggac gtccccgctg    3060
gccaccacgg tgatggattt catccacgtg cctatcctgc ctctcaatca cgccttattg    3120
gcagcccgca ctcggcagct gctggaagac gaaagttacg acggcggggc cggggctgcc    3180
agcgcctttg ccccgccgcg gagttcaccc tgtgcctcgt ccaccccggt cgctgtaggc    3240
gacttccccg actgcgcgta cccgcccgac gccgagccca aggacgacgc gtaccctctc    3300
tatagcgact tccagccgcc cgctctaaag ataaaggagg aggaggaagg cgcggaggcc    3360
tccgcgcgct ccccgcgttc ctaccttgtg gccggtgcca accccgcagc cttcccggat    3420
ttcccgttgg ggccaccgcc cccgctgccg ccgcgagcga ccccatccag acccggggaa    3480
gcggcggtga cggccgcacc cgccagtgcc tcagtctcgt ctgcgtcctc ctcggggtcg    3540
accctggagt gcatcctgta caaagcggag ggcgcgccgc cccagcaggg cccgttcgcg    3600
ccgccgccct gcaaggcgcc gggcgcgagc ggctgcctgc tcccgcggga cggcctgccc    3660
tccacctccg cctctgccgc cgccgccggg gcggcccccg cgctctaccc tgcactcggc    3720
ctcaacgggc tcccgcagct cggctaccag gccgccgtgc tcaaggaggg cctgccgcag    3780
gtctacccgc cctatctcaa ctacctgagg tgagggcccg ggacggggca cgcccagcgc    3840
gtccgggagt agcggttccg ttggcggcgg cggccgccaa ccctcagccc cagccccagc    3900
gcaccgctgc gctccccggg gcggccggag agggtgggca gcgggacaca gcacaggggc    3960
agttgcctcc cttcttcttc cctcctctcc tcactcttgg ggacacgaag gtgggcgcag    4020
aatatactat ttttggggcg tgcctccctg aaagctgttt ttttgtttgt tttttaactt    4080
```

```
tccgaatctt ccagattccg aagcagaacc aaccccgatt taaaacgtgc agcgtcacac    4140
taggtccgct gtagcccagt ggggcagaaa gtgcgcggcg agttgggggc tttatgaaat    4200
gcttctttct tagaagaagg acgtttacca ggagtgcttg tcttggagag gagttaaggc    4260
accgttcccc cgggaggggt gggacttgag aggtggccgg ccagaaccga aagcagcacc    4320
atcttaggga tttgaacact tcagtggctc agttttctta agaatctcaa gattaaaatt    4380
aagttcacgt gggaaatgtt taaactgtgg atttaaacgc ctgtcactgc attgcaccgt    4440
tttcttatta ttgcttgcta ttcactacaa tttttttat atacaggttt aaaaaacact     4500
actttgcata ctgaagtaat ggaatgtaaa aaaagaatgc tctgtttgga atcttatgtt    4560
gtgaataggc aaaacagtgt cagtgtattg gacaatactt taaaatgaca aacatatact    4620
tgcttaagta agcaatgatt acagggttgt gttttaaaaa ctcaaaacca aaacattgca    4680
aagtaccatc gaacttttaa agccaaacca tatttgtttt gacccagcat acagacagga    4740
aggacataac atttcatttg tcaaagacta aattgtttct atataaagag ttttgtagaa    4800
agatttcctt ttaaccgact ttaactttct aggacataat attatacact aattattgtt    4860
cttttatatt ggtgctactg atgaatggct aatcatttgc aagtatggtg aatccagtta    4920
cggatagtct attaccaagt ttagtttgca tgtctttcaa gtgtatatat acagttctgt    4980
ttttaaaatc tcctttcacc ctgttaatac tggtttaaga aacctttagt attagatagt    5040
ggtgcactta aaaataaatg gagtactttg ttttgcattt caagg                    5085
```

<210> 6
<211> 8222
<212> DNA
<213> Homo Sapiens

<400> 6

```
aagattagat gtaatcttgc caagcagcca ctttgtaaac tgtatagtct tatgcagatg      60
gaaggaaggg cctgtgccta ccttgatcat agcactaaac aaactgtact gtattttcat     120
tcctcttagt tatctcccta aaaagactct gagttccttg aacacaggaa ggtgttttat     180
ttgattttgt tatcctcagc atgtagcagt gtctgacaca cagtaggtgc tctatcactg     240
tgagagggat ggatggatgg gtggagttac agatggatag aaggatagat ggagggatgg     300
gtggatgatg gatggataga tggatggagg ggggatgatg aatggaggga taatgagtgg     360
atgaatgagg gaatgggtgg atggatggat ggagggatgg aggaacagat agatagatgg     420
agggatgggt gggtgatgga tggatagatg gatggaggga gggatgatga atggagggat     480
aatgaatgga tgaatgaggg gatgggtgga tggatgaatg gagggatgat gggtggatga     540
atgaattgag ggatggatgg atgaacacat ggatggatgg atagatggat agatggagga     600
actggtggat tttggatgga tgggtggatg gatagatgaa tgaatgcctg gatagacaaa     660
gagatgatgg atagatgaat agatgaatta agggatgtcg gatagatgga gggattgata     720
gatgttggat ggatgggtgg tggatggata gatgagtgaa tgcatggata gacaaagaga     780
tgatggatgg atgaattaag ggatgacaga tggatggatg gatgagtaac tggatggaca     840
agtggataaa tggatagatg gttgaatacc tgaatggatt gaaggaggat gcatggatgt     900
aagataaggc taatcatcct ccactctctt tctttgcaaa accatccacc catttactca     960
ataaacattt attcagttca aacttggcac aaagcaccat gtgaggccca agagatacgt    1020
gggttaataa aacagagctc ctgccctcct gaaaactgca aagaaagggg cgtggcttcc    1080
tgagttcaaa tcccaactct gccagcgact agttgtacat cagtgatgtt tccctacttt    1140
ctctcaatta aatagggata atgtcagtac ctatcacatt gggaggtctt gcggggatta    1200
aatgagttac caaatgccaa gtgtttggga cagggcctgg cacccagcaa agtctcttgt    1260
gagtgctggc tgctattatc ctaatggaga agatggcatg aaaaccagga aataggatgc    1320
cctttgggaa gcaatgcaac aggaacttac acaaagaaag gaaaggagga agcaattagt    1380
ggtgtctcaa aggagtatgt caagaaaaac ttttcagagg gaaacctttg agcagggtca    1440
tgaaaacagg agttctctaa gagattgtgg acttgcctgg gaccacctgg ctataagcac    1500
aaaaccatcc ggttcctttc tgtcacttct ggctgggtga ggggtctctg gcaaaggggc    1560
agaaggtgcg tgagaggttg cgaatggcca ggactgtcct ggggccagcc ggggcacctg    1620
gtggccaagc ttagaaacat gacaggtcct cttgggaggg ctgaccgcag ggagcgttgg    1680
gtttcaggct gctggcgtcg gcttctgtgg tgccctttct gtcggctatg agagtccaga    1740
cagtgcccaa cctcctcccc ttctttccac acgcacaacc accccacccc ctgtggcctg    1800
agctgtcctg cctcgccaca atggcacctg ccctaaaata gcttcccatg tgagggctag    1860
agaaaggaaa agattagacc ctccctggat gagagagaga aagtgaagga gggcagggga    1920
gggggacagc gagccattga gcgatctttg tcaagcatcc cagaaggtat aaaaacgccc    1980
ttgggaccag gcagcctcaa accccagctg ttggggccag gacacccagt gagcccatac    2040
ttgctctttt tgtcttcttc agactgcgcc atggggctca gcgacgggga atggcagttg    2100
gtgctgaacg tctgggggaa ggtggaggct gacatcccag gccatgggca ggaagtcctc    2160
atcaggtaaa aggaagagat tccattgccc ctgccaccca caccctaaga tcaaggtgt     2220
tcagctgcaa ggtggaaagt ttgcacgtgg ggtaggtcag ttggctgcat tagttaaggg    2280
```

tgttagaacg gtcacttgct ttttctttgc ttttaagtgt cagggattgg actcaggaga 2340
gggaaaggag ccatttcagg ctgatgtcag cagctggagg aagcatgaga atcaaaccta 2400
ggatgctcag agtccaccag gaagaatttt agaattatag acagtcagag ttaacaaggg 2460
tcctgagaga ttttgtacag ccacctctct tacaggatga ggacaaaaag ggactgagaa 2520
ggggaggaca tttccagagt cacagctcat taaatgctct taaagtgtca aggttaagac 2580
atgctcttca aggggagaca gatctggttc tagacttggc tctgccactg agccactggg 2640
tgacctttgg gaaagtactc aacctctcgg agcctcaatt tcctctcctg tacagtgagg 2700
ggatatccta atatctatat cctagaggag atgtgagaat taaataaaat aatgcatgca 2760
agaggcctgg catggttcct ggcatatact gagtcctaga aatgttagta gctattactg 2820
atgaagccca ggctagggac ctttcaaagc attgcaatta gagaacagaa gatagaggct 2880
cattagtgac cttcgatgtt gagtatgtct ctagtttgag aggtctgaat gatgtggtct 2940
gcaagtatat cctgccttct accacaaggg attccagaat acaccaaaga aaacaaaatt 3000
ctgaggtttg taaatagagg gtggctgtgg tttgtacata gaagctcatc tcctcgttgc 3060
cttctatccc aaaggtgata cactcttctc ttggcccctt ccctcaccat tctgagctgg 3120
ttccctcaga agtctaatag gttaagaatc aacgtttctg ccaacgggag gaaggaagtg 3180
ggcgccgggg ttgccacaag tgaatggatt gtctttggca ctttaatttg cagattaatt 3240
tctccttatt tgtgagccag agccaatttt cctcttccac tccgtcgtcc tttgggtctc 3300
ccttgggctt tacccatttc cagcttccgt ctacctcggg agcatggctg gtcctggaag 3360
ctccgttatc taaaatttga gccgttggtg atccgtgcta gaaacacttg aggaagaaga 3420
gttgagtttt ctgttgactg taatggcatc gtagtgtgtt tatgtctttc ttctcctgtc 3480
cctgtcatct ggctgcaaca ggccctgttg gattgcacaa agtgctcccc cgaccaacac 3540
acacacacaa attgacatca actcctgggc cacagatatg ccatgtgacc ttggacaagt 3600
ctctccacct ctgggcctta tttctctgct ggttgagcga agggattgtc ttccatggtc 3660
tccgagatcc cgtcccacgc tcatgcccta gaattctctg agtccttgat gcacttttgc 3720
ctttggcgag gaggcaggac agtcaggcgt ggaggtagga gaccagagtt tgcagagcag 3780
aggtctttcc aaggtgattt gggagctgcc agacctaagg cagtgacttg tacgtcttga 3840
aagagactca gggtgttgca tcatcaggga ggatcacgga ggtttgccgg gggccgggag 3900
ccagggataa gacataatgc ctagggttgc tggtccctga aaggtcccag aggcctggtg 3960
ccctgtcacg tcttaggttg tgggacatgc agagactgtg ccagctggtt ctgccctctc 4020
agtatttggg gtacagggag gatggcctcc ctgggggcag ggtggaggag gctcatgccc 4080
aggactgcaa atgccacccg tgagagttgg catcttgact ttgttctaga tactgactct 4140
ggattttcta actgaccttg aaaggttatg tctccaatct tctgattgta aaagagggca 4200
aattccatga agcccagtct gtaaaacact gaggccttca ctgcacgtac acaaacataa 4260
aattctagaa cacagaagct ggaaggtcac ttggagattc tggctccagg agtggggctt 4320
cggaagggag ggggctgctg agtgggctcc acacccctgt ttttcctttc tttactcaaa 4380
cctttttgt tttatttact ttggctgttt tggggagcgg ggggaacaaa ggatttcaag 4440
gtcataaaat gtttgaaaat caccagtggt ggtcactact tctcattaca gggaggaact 4500
gggcctgaga gtctccaccg gttaatggca gccacaggca ggaccaaaaa ttcctgggtg 4560
atggtgatga taatgataat gataatgata atggtagaga tgatgaggag gagaaagaca 4620
gcaaccattt attcagcaca tactgattgc tgggctctgt ttaagtgttt cactcactga 4680
agcctgacaa caatcttatg aggtagatat gattatgatc accacattta acagagaggt 4740
taagtaactt acgccaagtc acacagcaag taagaaagga gctggaattc aaattcaggc 4800
agcttggatc cagaatcctt gctccttttt tttttttttg agatggagtc ttgctgggat 4860
tacaggtgca tgccaccatg cctggctaat ttttgtattt ttagtagaga ctaggtttcg 4920
ccatgttggc caggctggtc tcgaactcct gacctcaggt gatctgcccg ccttggcctc 4980
ccaaagtgct gggattacaa gccaatgagc ccggcccaga atccttgctc ttgaccacta 5040
tgctatactg ccccatgacc ttgccacacg caagacgggc tgccacccac gctctggttc 5100
ttttattcta gtagagccag aggggtgttc atggatctga caatgtgctc catgttccat 5160
gtgagtgtcc aattgggcct cagttcagag aacagcagga aaatggcctc ccttctctct 5220
gacttggact gaagatctgt ctgatgaacc aggcccactg acagcagggt tgaagctgga 5280
aacacaggcc agcggggctt tctgaaatac tagagcaaac gccctccgtc catttccaca 5340
ggctgagggg ctttcatctg ttcattttcc ggatcaggca aatccaggag aatggccttc 5400
tgtggctgcc tgggggggctc ctagctgcaa ggcctgggcc cacaggaggc aggcagctgt 5460
gtggtgccgg aatgatcttg cggggagaca aattagcccg attctgctct gctgtttaaa 5520
gtaaatatgg ggtggggtgg ggtggctcag gcctataatc ccagcacttt gggaggcagg 5580
atcggggaat cgcttgagtc caggagttcg agaccagcct gagccacata gtgagacccc 5640
ccttctctac aaaaaataaa caaaattagc tgggcgtggt ggtgtgtgcc tgtagtccca 5700
gctacgcggg aggctgaggt aggaggatca cttgggccca ggagattgag gctccagtga 5760
gccaagatca caccactgca ctccagcctg ggcaacagag caataccgtg tctcaaaaaa 5820
atattaataa agtaaatatg agctctctcc ctggctgtct ggtgttgagt ggaaagaaag 5880
gcattggcgg gtctagaccc ttttggttta catatggatg agcaatgatc cagagaggct 5940
aagtgacttc aacatcacag agcacattgg cgccagaact gggaccggaa ctcagcttcc 6000
gtaactgtca gtcccatgtt ctcttcccta gatatcagag ggcaggggca ggccccaaaa 6060

tgtctgagac ccccagctgc cttgtggccc aaattcttgg ccctgctctg cctcagacag 6120
tctgctttca gcgtcctgac ctctgaccat cgcctgtgca tgccaggtct tgcatctgtc 6180
aggcgggagt tcaaggatca ttgtcgccag ataataatag tcaggagctc agggaccctt 6240
ggatgaaagg tgtcagagac aagccgtcag tgacgcacga ggatttggat aaggtcctgg 6300
agcgaggtgg caatgttggg cacggcggca gaccatgccc aacatggggg aagggagtgt 6360
atgtggttca ggcttgtgcg tgtctctgtg tgtgtgtgca ggtgagtatg gcgtgtgctg 6420
ggatatattt atgtgtacct ctgtgtgagt gtgcaggccc atatgtgagt gtgcacacac 6480
atctgtgaga gcctgcatgc atgtacacgt gtgaggtgtt gatacatgtc catgtaggta 6540
tcagtttgcc tgtaaatatc tctgtgtaac aataacaaag tccgaatagt catcaagagt 6600
atagacatga agccagactg cctgggttaa atccccagct agttagtctt tcggtgcctc 6660
tgtttcttcc tctgcaaaat ggcgtctacc ccatcaggat tttaaaatca gttaatatgg 6720
ctgggcgcct gtaatcccag cactttggga ggctgaggca ggcggatcac aaggtcagga 6780
gatcgagacc atcctgccta acatggagaa ttctgagaat tgctcaaacc caggaggtgg 6840
aggttgcggt gagcagagat tgcaccactg cactccagcc tgggcaacag agccagattc 6900
catctcaaaa aagaaaaaca aaaaacaaaa aaaccatgaa ctcattttca ggttgaggag 6960
ctcagcatcc tggttgtgaa ataccctcct cataaaaccc tgggatggag actacgggga 7020
tcaggtgctt ccttgtgaca acttctgggc atggtggctc agggcgcaaa ctggagtgtg 7080
gccacaatac atactgtgta cttttacaag gatgtcacag agcctgggta tcataaaaga 7140
ggagcttttc aaggaactga aaccattaga caggagagag agccctgggc agacagggtt 7200
gcccgtgcca aacatttcag ctgtggcaca agggaaaggg tgggagttat gaaactgttc 7260
cattttgggt ttaggtctgg gctctgccgc tagctagcca agtgaccttg gccacttatc 7320
tctgtggtct tccatgagta aaaggcggaa actcactcct acccagaggg caggtctgac 7380
tccctttaac cagcacccac ctgctcacag caggaaggac tgaggtctaa agctggaggt 7440
gggcaggaag gactgaggtc taaagctgga ggtgggcagg aaggaccaag gtctaaagtt 7500
ggaggtgggc aggaaggacc gaggtctaaa gctggaggtg gctgctcaga gtcccagcag 7560
aggcctctgg ggcacctcac tgagtgcctg gcaggagtgg gtgcctgtct cagggctggg 7620
ttgagttgct cccaccagga cccttcgtca tctgcacagt gaggggactg ggaggttcag 7680
agagtcacag cttgggctca aaacaagcaa gaggtttctg agtgtgagga ttgctctgga 7740
gtggaatggc cctcacaggt aggagtgagc ctcctgtagc tagaggtatt taagcagctg 7800
aaggacaatc cctgggcagg aagctgcaga gatggtcgca gcgtggacta gaactgctgt 7860
tttggtcact cagacctcat tccagcctgg cttctctgga cagcacccct gcaatagtga 7920
gctggtgact ttacgcctca gaacctcggt ttccacatct gtaaaatggg aattatatga 7980
cactcactat gtgccagaca ccctgttggt acatagcaca cactatctca cttaatcctt 8040
caagtaggga caagttatcc ccatccctta tatgaggaag ctgaggcaca gagaggtgaa 8100
gtgaatggcc caaggtcaca cagctgggaa gacagggagc taaacttgaa ctctagtctg 8160
gctgccccca gacctcacac cgcacctccc atgccgactc cagccttccc tgtgcccaca 8220
gg 8222

<210> 7
<211> 3051
<212> DNA
<213> Homo Sapiens

<400> 7

acagtggctc atgcctgtaa tctcacactt tgggagaccg attgggaaga ttgcttgagc 60
ccaggagttg gagaccagcc agagcgacat agtgggacct tctctctaca aaaacattta 120
aaaattagcc aggtacagtg gtgcacccct gtagtcccag ctatttggga ggtggcaaga 180
ggatctctcg agcctagaag ttggaggtgg cagtgagtag tcatcttgcc actgcactcc 240
agcctgggtg tcaaagggag actcccctct ctagaaaata ataaaaaaaa aagtttgaca 300
gttttcttgc ttgtgctaca taaaataatg gtacatatta caattgaagg catcttataa 360
tagaaatgcc ctttcctgtt ccctttaag gctgacccag tgctttaaga ggctgataca 420
gaagggtaaa gttaagtctc cacaaaatcc agggaagaga ctgtgaaact catcttagaa 480
ccttgtatgg agtcacagct gaactaggaa aaaaaaaaa aaaaaaaaa ggaaagaaag 540
gcattccaga gataaagaat agactaagga gaggagatat ttgaagccat aatgattgag 600
aatatgtcag acttgaaatg aatcttcagt tccctcaaca agacaaataa aactaactcc 660
atacctagat acatggtaga aaaactaaag aattctgctg accaaggtat taaaagtaac 720
taaagagaag tggtgtgaag aaagcaagag agaaacaaca aatcctgtcc atcctgtaac 780
aattgaaaat ttctggctgg gcgtggtggc tcacgcctgt aatcccagca ctttgagagg 840
ccgaggcagg tggatcacct caggtcaggt gttcaagacc agcctggcca acatggtgaa 900
accccgtctc tactaaaaaa aaataataat aataatacaa aaattagccg ggggtggtgg 960
taggcacctg taatcccaga tactcgggag gctgaggcag gagactcact tgaacctggg 1020
aggcggaggt tgcaatgagc tgagatcgcg ccactgtact ccagcctgga tgacagagca 1080

```
ggactccatc tcaaaaagaa aggaaaagaa aagaaaaaat attaaatgtg tacgctcttt   1140
gactcagctg tattacttca aggagttgat atcaccaaaa ttgcctaagt gctcaaaggt   1200
gtttgtagtt aaacaacagg agattgataa attatgttat atacatgtga tgctatgttt   1260
taaagaggta ctgatatgat aaaagatgta cgtggcataa aattaaatgt actttattaa   1320
gtacttttcc aagtgtttac ggaatgagtg catttttgaa aaaaaaaaag tgtattcgaa   1380
cttttaaaaa agctttaaaa gctttataca atgaacgatt gagtgattat aagagctggc   1440
gggggaatgt taagaggatg atagggagct aagtttaaca gaacaattca cctctttatc   1500
ttgtgacacc tacgagcgca tcaattctgt aattgaaaaa taaagtgcat atttgcagca   1560
gctgtactct cttcaggctg caaggaggct tttcctcccg gtaggcttga tttgcatttc   1620
actttcactt tcgtggctgg aaactttcta cccacgtagt gggaggctga ggagccacca   1680
taaagctggg gcttgacgag ccgggaccgg gacccgatct ccacatatgc ccggacttgt   1740
tctgcggccg ggttcaggag tcaaagaggc ggggagacct gcgcgacgct gccccgccct   1800
gcgcccgctt cctccaatgt atgctctagg gggcgggcct cgcggggagc atggacacga   1860
ttggccctaa agtcttcccc gcaaggccgt gggctggaca gcgtggtgac gtcgcaacgc   1920
ggcgcagggt gagagcgcgc gcttgcggac gcggcggcat taaacggttg caggcgtagc   1980
agagtggtcg ttgtctttct aggtctcagc cggtcgtcgc gacgttcgcc cgctcgctct   2040
gaggctcctg aagccgaaac cagctagact ttcctccttc ccgcctgcct gtagcggcgt   2100
tgttgccact ccgccaccat gttcgaggcg cgcctggtcc agggctccat cctcaagaag   2160
gtgttggagg cactcaagga cctcatcaac gaggcctgct gggatattag ctccagcggt   2220
gtaaacctgc agagcatgga ctcgtcccac gtctctttgg tgcagctcac cctgcggtct   2280
gagggcttcg acacctaccg ctgcgaccgc aacctggcca tgggcgtgaa cctcaccagg   2340
tgagcctcgc ggccccggga agccggcccc ggcccgcctg cacctccggt gcttggcggg   2400
agcgctttcg agcctagccc tcattggctg gcgtgggcca tccgcgcctt ctcattggcc   2460
tgccacgcag tggggtgggg cccagctgag cgcgcggttc ggaaaagccc gcgctggctg   2520
ctgcgcgaac ctgctttttc gcgccaaagt cacaaagcgg gtggtggcgg gaaaatcaag   2580
ggtttttccg cagtgccagg aacactgttc cagggctctt tgctcactaa atcctgttgg   2640
ccttgaatgg acgctttagc tgtggctttc ttgtttctga gacggtctcg gtgtgttgcc   2700
cgggctggtc tccaacttct gggctcaagc gatcctcccg gctcagtcgc ggttgacttt   2760
aaatgcttta taatgccctt gcgagaaatg tggcagcctg tcatcctact tagtggcagg   2820
agattgtttc tatccagaag ggacactgct ggtggtattt tagtataaat actgccagat   2880
gcgtcccaaa acgtctgcat taataatggc atcctccagc agtccgctta ccctccacca   2940
gttctgagac ggcctgatgg gtgagagtgg taaccccttc taaccgcgtt cgaaatacag   3000
cccttcagca gacggcgttg attttaaagc atgtgtctcc tgtcttctag t            3051
```

<210> 8
<211> 3664
<212> DNA
<213> Homo Sapiens

<400> 8

```
gaattcccaa ttatcatcct gctcccctac cctcaacacc tccagcggta actgtatctt     60
attcattttt gtgtctatga agcacagtgt tgcactttgg agatactaca tagaagttgg    120
cccaaagggt aataaactgt atttgccaag atgatagcat ggatttacaa taacctctga    180
aactttataa agaaagatga ttgagttaaa ttgatacacc tagcatcaca gctgtggaag    240
cttgtggtct tctttatgtt aaaggtaaaa tggatataat gaattagttg ccatttttag    300
atgatataga agttgaattc ctcttaagcc tctcaaagag aaagacatat taaaattcat    360
taaaaccagt accataaact gcacagaaca gcctggttcc ctagagcact tctctggggc    420
agtgagtttt catttaaaaa atgaagtttg gattttaaac ataagtttta aaagtgatta    480
ggctccagca ggagttctta aattcctacc tacaccatga ctcccaaatg ctctgcctct    540
gttgcctagg aacaaaaatt gtcaaggttg agccagatgc aatgtataac accagatgat    600
agatgcagct cattgtgtta aaaggtgtta aacacttaag tgcatgtgat atactctata    660
tcacaagggt aaggaagttc cattccatat cctgatttgg gtcttctaat acatacttgt    720
agtggatgtg gtaatcagtc tttgttctat gtcccattag gatcaatgca accagaaatc    780
cttaaaatgg atttttatta tgtctagctc tgttttactg ttctatttgt ttattttaaa    840
aagattttag aatggtgttt aggttgggct ggtggctcac gcctgtaatc tcagcacttt    900
gggaggccaa ggcaggagga ttgctggagc ctaggagttg gagaccagct agggcaacat    960
aaggagacat tgtctccgca aacaaacaga aaaaaaaaaa gtaagaaaga aagagagaaa   1020
gaaggaaaga acaagaaaaa ggaaaaaaaa attaactgca gtaagtgcag aaatctctct   1080
caaggatatg atggatggca atgaagacag agtttttgac actggattat ttaaagcata   1140
atttaagcct ctttctctcc cctcatagaa ttgtgaattt ttgtgtttta attatattta   1200
agccaggcgt ggtggcgagt gcctgtagtc gcagctgcgc tggaggctga ggccgattgc   1260
ttgagcccag gatttggagg ccagcatgcg caacataatg agacccagtc tctaaatgca   1320
```

tgcctctctc tatatattta aaattctgat gtgaaaatat tttaaaattt aatacatttc 1380
aaatgttttt aattgtataa taaacaaaat gtaaataata aaataattta atattaaatt 1440
caaaaatgag gtagaaacaa agcacagcga tataaataat aaattttcct ttacattttt 1500
gaggcggtct tttgagtttt ccatttcctt cttaaggtca ctgaaatgtg ctccttggag 1560
ccagcccgca aatcacgcat ttagaaaaac ataactatac actcctaacc ctaagtatta 1620
gaagtgaaag taatggaatc tcgatgtaaa cacaatatca ctttttttgat gagctatttt 1680
gagtataata aatttgaact gtgccaatgc tgggagaaaa aatttaaaag aagaacggag 1740
cgaacagtag cttcctgctc cgctgactag aaacagtagg acgacactct cccgactgga 1800
ggagagcgct tgcgctcgca ctcagttggc gcccgccctc ctgctttttc tctagccgcc 1860
ctttcctctt tctttcgcgc tctagccacc cgggaaggcc tgcccagcgt agctgggctc 1920
tgattggctg ctttgaaagt ctacgggcta cccgattggt gaatccgggg ccctttagcg 1980
cggtgagttt gaaactgctc gcacttggct tcaaagctgg ctcttggaaa ttgagcggag 2040
agcgacgcgg ttgttgtagc tgccgctgcg gccgccgcgg aataataagc cgggtacagt 2100
ggctggggtc agggtcgtgt ctaggggacg gccgagggcc tcggagggcg agtattgagg 2160
aacggggtcc tctaagaagg ccggactgga ggtcagggat ctgcgcgggg cccggctggg 2220
cctcgggggg cggtgggcag ggccttcgcc tgggtctggc cgtgtgagcc acactgggct 2280
ggctttagag ggaggctatg ggagcccagc ctggcggggt taggcggcgt gggggtgggg 2340
gttcggggct gcagtcatga gtcgaggtcg gctgttctca ggaactgcct gaagaggctt 2400
tcgggtcttg attgaagcaa aatccgctcc cccacgctga gcgcctgcgg agtagcaggc 2460
tctttcctgg gcccggcccc tgcgcgccct gccatcccgc ctcgggggtg ggaaagtggg 2520
accgcacctg ggccaggtac aggcgcgggt ccctagagcc aggccgccct gagaaaccga 2580
tcctggaact cgtgggcctt cttgggcttg ctctgcccac ggccccggcc cacctggagc 2640
tgttaagaac agtcagccca ggcacttaac tctcatgagc agtgtagtgc agtttttttc 2700
atttaaaaag atacatctct gcttctttct ggattgattt ttctttgaag atgaatgtga 2760
gaaatagaac ttaaaggtct attctgagtg tgctttataa atgattttat catcagtgat 2820
gggtgttaga aaaatctagg taattatgcc tggagttctg acgtttcatt ggcaaacttc 2880
agaggaagtc ttgaacttct ggttgtcagc tttttttttt aacccattca ttgtgattca 2940
agtataccgt ttttctgctt agtccttgac attgtttagg ttataattag aattttatct 3000
gtggaattgc acttttcatt cttttgtttt acggtgctta agtgatattt cctactcttg 3060
gaaaaagtac cttgaaagtc ttgagcatgt ttgtctgtga cctcagcaag cagaggaaaa 3120
agattaaaat tgtcacgtgg gcaactgtaa acacttaaaa tgtttttgtc gttttaaaca 3180
aaattttcct aatgaacagt ctgaacacat tttagttctg tcctcataac tttaaaaaat 3240
aatgttttga ataaaattag gagtatcata aagcggtata aatttgttga aatatttggg 3300
tataactttg gcacacgcag gtactacttt aaagtgtcac aaaaagggaa cataattctg 3360
gtttttgttt ggaaagaata gacaagttga tacctgaatt tgagggttat tttgattgga 3420
agaagctaaa tactacacta gtatagaata tacacgtttc caatgtctca ggagtcaaga 3480
aggatggaaa gttattgtag gagtccttac ccttgtaaat attgtttgaa tgtaattaat 3540
atttatggaa tacttatgct gcagtaggca ctgtggaaaa tgctttacat atagtgtttc 3600
attaatgctt aaaactactc gagttagtgg catgtaatta agtcagtttt tccttcactt 3660
tagg 3664

<210> 9
<211> 1729
<212> DNA
<213> Homo Sapiens

<400> 9

ctgcattctt ggctggggca ttccaactag aactgccaaa tttagcacat aaaaataagg 60
aggcccagtt aaatttgaat ttcagataaa caatgaataa tttgttagta taaatatgtc 120
ccatgcaata tcttgttgaa attaaaaaaa aaaaaaaaag tcttccttcc atccccaccc 180
ctaccactag gcctaaggaa tagggtcagg ggctccaaat agaatgtggt tgagaagtgg 240
aattaagcag gctaatagaa ggcaaggggc aaagaagaaa ccttgaatgc attgggtgct 300
gggtgcctcc ttaaataagc aagaagggtg cattttgaag aattgagata gaagtctttt 360
tgggctgggt gcagttgctc gtggttgtaa ttccagcact ttgggaggct gaggcgggag 420
gatcacctga ggttgggagt tcaagaccag cctcaccaac gtggagaaac cctgtcttta 480
ctaaaaatac aaaaaattag ctggtcatgg tggcacatgc ctgtaatccc agctgctcgg 540
gaggctgagg caggagaatc acttgaacca gggaggcaga ggttgtggtg agcagagatc 600
gcgccattgc tctccagcct gggcaacaag agcaaaagtt cgtttaaaaa aaaaaaaaag 660
tcctttcgat gtgactgtct cctcccaaat ttgtagaccc tcttaagatc atgcttttca 720
gatacttcaa agattccaga agatatgccc cggggtcct ggaagccaca aggtaaacac 780
aacacatccc cctccttgac tatcaatttt actagaggat gtggtgggaa aaccattatt 840
tgatattaaa acaaataggc ttgggatgga gtaggatgca agctccccag gaaagtttaa 900

gataaaacct gagacttaaa agggtgttaa gagtggcagc ctagggaatt tatcccggac 960
tccgggggag ggggcagagt caccagcctc tgcatttagg gattctccga ggaaaagtgt 1020
gagaacggct gcaggcaacc caggcgtccc ggcgctagga gggacgcacc caggcctgcg 1080
cgaagagagg gagaaagtga agctgggagt tgccactccc agacttgttg gaatgcagtt 1140
ggaggggcg agctgggagc gcgcttgctc ccaatcacag gagaaggagg aggtggagga 1200
ggagggctgc ttgaggaagt ataagaatga agttgtgaag ctgagattcc cctccattgg 1260
gaccggagaa accaggggag ccccccgggc agccgcgcgc cccttcccac ggggcccttt 1320
actgcgccgc gcgcccggcc cccacccctc gcagcacccc gcgccccgcg ccctcccagc 1380
cgggtccagc cggagccatg ggccggagc cgcagtgagc accatggagc tggcggcctt 1440
gtgccgctgg gggctcctcc tcgccctctt gccccccgga gccgcgagca cccaaggtgg 1500
gtctggtgtg gggaggggac ggagcagcgg cgggaccctg ccctgtggat gccccgccga 1560
ggtcccgcgg ccggcggggc cagaggggcc cggacgagct ctcctatccc gaagttgtgg 1620
acagtcgaga cgctcagggc agccgggccc tggggccctc gggcgggagg gggcagttac 1680
acggcagcgg ctcgagatgg cccatccaag agactggcgc tttccaggc 1729

<210> 10
<211> 12963
<212> DNA
<213> Homo Sapiens

<400> 10

gtcaggagcc ctagaaacag gggagagtta gaaagctggc cagacctatg cttttcaagt 60
gtagggctag ggctgagcct gcctctgggg taggtaagcc cccctgaatc cttgagggaa 120
gtagaagaca caaactgcta gataaaatgt aagctcagtc taaaagggct acgtgccgct 180
tctcccagct ctggggcatc cctctcctag aaaactggac tgttttacag tgaaaatctc 240
gggggtggtc agctccctgc cccgttgtta tccttaccac ttacagcctt tcaagaagtt 300
ctcaggttgg gtgctgaact ctgaccagga accactgaga aatcgaggca gctgggagaa 360
gctgtagttc caagcgctga aaggaagatg gggacaata aacctgggtc gccaagcaaa 420
gggggcagag gcctggagaa gtgggtctca ggaccagagg acagatcgac ctcacacttc 480
atctccccag actccacact ccactgccat caccacttac gtgtctccct cgtcctctgc 540
agcgggttcc ccagaggtat cttccatggc ttttccagac cccaactctg gcccgttcgc 600
ttcttcttca gaaaggctcc cgtttgcttc ttctgcagga aggcttgtat tttcagaaag 660
ttcttgctcc tcgattcgag gactcaactc actaggggaa ccaaactctg tttccagggg 720
agtggagaga gaaactgggt ccccctcccg tagctcctgg gacacagctg agccagccac 780
aggatctggg gacaaccggg gcggatcccc cctttcggga ggcggtggca tcagttcaga 840
gtccgcattt ttattcatcg gggaagcgtg gggagaagga tgggctggag ctgggtcctg 900
gtctgaagga cagcagtccg gagctaacgg ttgagtctcc aaagtcttca tactgcagag 960
gaagcacagc ggagattagc ctcagccagg atggcttcga agttctcagg gatccgacgc 1020
agagctaaag aaacccacct gtgcttccct cctcttctgg gagtaggcag aagactcccg 1080
ggaggagagg cgaacagcgg acgccaattc ttttgaaagc actgtgttcc ttagcaccgc 1140
gggtcgctac gggcctcttg ctgtcgcggg atttcggtcc accttccgat tgggccgccg 1200
catcccggat cagatttcgc gggcgaccca cggaacccgc ggagccggga cgtgaaaggt 1260
tagaaggttt cccgttccca tcaagcccta gggctcctcg tggctgctgg gagttgtagt 1320
ctgaacgctt ctatcttggc gagaagcgcc tacgctcccc ctaccgagtc ccgcggtaat 1380
tcttaaagca cctgcaccgc ccccccgccg cctgcagagg gcgcagcagg tcttgcacct 1440
cttctgcatc tcattctcca ggcttcagac ctgtctccct cattcaaaaa atatttatta 1500
tcgagctctt acttgctacc cagcactgat ataggcactc aggaatacaa caatgaataa 1560
gatagtagaa aaattctata tcctcataag gcttacgttt ccatgtactg aaagcaatga 1620
acaaataaat cttatcagag tgataagggt tgtgaaggag attaaataag atggtgtgat 1680
ataaagtatc tgggagaaaa cgttagggtg tgatattacg gaaagccttc ctaaaaaatg 1740
acattttaac tgatgagaag aaaggatcca gctgagagca aacgcaaaag ctttcttcct 1800
tccacccttc atatttgaca caatgcagga ttcctccaaa atgatttcca ccaattctgc 1860
cctcacagct ctggcttgca gaattttcca ccccaaaatg ttagtatcta cggcaccagg 1920
tcggcgagaa tcctgactct gcaccctcct ccccaactcc atttcctttg cttcctccgg 1980
caggcggatt acttgccctt acttgtcatg gcgactgtcc agctttgtgc caggagcctc 2040
gcaggggttg atgggattgg ggttttcccc tcccatgtgc tcaagactgg cgctaaaagt 2100
tttgagcttc tcaaaagtct agagccaccg tccagggagc aggtagctgc tgggctccgg 2160
ggacactttg cgttcgggct gggagcgtgc tttccacgac ggtgacacgc ttccctggat 2220
tgggtaagct cctgactgaa cttgatgagt cctctctgag tcacgggctc tcggctccgt 2280
gtattttcag ctcgggaaaa tcgctggggc tgggggtggg gcagtgggga cttagcgagt 2340
ttgggggtga gtgggatgga agcttggcta gagggatcat cataggagtt gcattgttgg 2400
gagacctggg tgtagatgat ggggatgtta ggaccatccg aactcaaagt tgaacgccta 2460

```
ggcagaggag tggagctttg gggaaccttg agccggccta aagcgtactt ctttgcacat 2520
ccacccggtg ctgggcgtag ggaatccctg aaataaaaga tgcacaaagc attgaggtct 2580
gagacttttg gatctcgaaa cattgagaac tcatagctgt atattttaga gcccatggca 2640
tcctagtgaa aactggggct ccattccgaa atgatcattt ggggtgatc cggggagccc 2700
aagctgctaa ggtcccacaa cttccggacc tttgtccttc ctggagcgat ctttccaggc 2760
agcccccggc tccgctagat ggagaaaatc caattgaagg ctgtcagtcg tggaagtgag 2820
aagtgctaaa ccaggggttt gcccgccagg ccgaggagga ccgtcgcaat ctgagaggcc 2880
cggcagccct gttattgttt ggctccacat ttacatttct gcctcttgca gcagcatttc 2940
cggtttcttt ttgccggagc agctcactat tcacccgatg agaggggagg agagagagag 3000
aaaatgtcct ttaggccggt tcctcttact tggcagaggg aggctgctat tctccgcctg 3060
catttctttt tctggattac ttagttatgg cctttgcaaa ggcaggggta tttgttttga 3120
tgcaaacctc aatccctccc cttctttgaa tggtgtgccc cacccccgg gtcgcctgca 3180
acctaggcgg acgctaccat ggcgtagaca gggagggaaa gaagtgtgca gaaggcaagc 3240
ccggaggcac tttcaagaat gagcatatct catcttcccg gagaaaaaaa aaaaagaatg 3300
gtacgtctga gaatgaaatt ttgaaagagt gcaatgatgg gtcgtttgat aatttgtcgg 3360
gaaaaacaat ctacctgtta tctagctttg ggctaggcca ttccagttcc agacgcaggc 3420
tgaacgtcgt gaagcggaag gggcgggccc gcaggcgtcc gtgtggtcct ccgtgcagcc 3480
ctcggcccga gccggttctt cctggtagga ggcggaactc gaattcattt ctcccgctgc 3540
cccatctctt agctcgcggt tgtttcattc cgcagtttct tcccatgcac ctgccgcgta 3600
ccggccactt tgtgccgtac ttacgtcatc tttttcctaa atcgaggtgg catttacaca 3660
cagcgccagt gcacacagca agtgcacagg aagatgagtt ttggcccta accgctccgt 3720
gatgcctacc aagtcacaga cccttttcat cgtcccagaa acgtttcatc acgtctcttc 3780
ccagtcgatt cccgacccca cctttatttt gatctccata accattttgc ctgttggaga 3840
acttcatata gaatggaatc aggatgggcg ctgtggctca cgcctgcact ttggctcacg 3900
cctgcacttt gggaggccga ggcgggcgga ttacttgagg ataggagttc cagaccagcg 3960
tggccaacgt ggtgaatccc cgtctctact aaaaaataca aaaattagct gggcgtggtg 4020
ggtgcctgta atcccagcta ttcgggaggg tgaggcagga gaatcgcttg aacccgggag 4080
gcagaggttg cagtgagcca agatcgtgcc actacactcc agcctgggcg acaagaacga 4140
aactccgtct caaaaaaaag gggggaatca tacattatgt gctcattttt gtcgggcttc 4200
tgtccttcaa tgtactgtct gacattcgtt catgttgtat atatcagtat tttgctcctt 4260
ttcatttagt atagtccatc gattgtatat ccgtcctttt gatggccttt tgagttgttt 4320
cccatttgcg gttatgaaat aaagctgcta taaacattct tgtacaattc tttttgtgat 4380
catatgtttt cgtgtttctt ggagaaatac ttaggagggg aattgtggag gaagtaaaaa 4440
gtagctgtat tttgaacttt ttcagaagct ctgagttttc cagagcggtt gtaccatttt 4500
acactccaac tagcaaggta tgggagttat tatggttgtg ccacagcctt ccggacatta 4560
ggtatgtcag tctttctaat gtggtatatc cttgtggttg taatttacag ttctctattg 4620
actaaggatg ttcagcattt tttcatgtgc ctattggcca ttcgtatttt gtttgtaaag 4680
tagctcttcg agtcttttac ctgttatttt ggttttttg tttgtttta ttgttcagtt 4740
gtgggactgc tttatacttt ctggatacaa gtccttatca gatccatgag tcgtgaatgt 4800
tttcttctga tctgttgcgg gcctatttgt ttgctttaca gagtttacag aatcttaaga 4860
ggagtggatt aatctttttt atgttcagta tttgccttgt cctgtttagg acatcttttt 4920
tttttttttt aaccccaggg tcatgaagat ataatcttac attttctttt aggaccttta 4980
tggtggtaag ttttacagta aggtccttaa gccattaatt aattcttaaa attaattgtt 5040
tatggtgtga ggtgtaggag tcagtctctg gtatctttcc tgtatggaaa tccagttatt 5100
ctgtctccac ttgttgaaat aggcttcctt tctctactga atgcttttaa ttttaattat 5160
tttacagttg gagtataggg ctaccatttt agtgctattt tcttttttc tttgttaatt 5220
tttgagacag ggactcacac tgttgcccag gctagagtac aatggcacaa tcaaggctta 5280
ctgcagcctc gaacccctgg gctcaagcag tcctctagca gcctcacgag tagctgggat 5340
tactccacca cacccagcta actattttat ttttttgtat tgacaggatc tcactatgtt 5400
gcccaggctg gtctcaaact gctggcctca agctttcatc ccatctcggc ctcccaaagt 5460
gctgggatta caggtgtgag ccaccatgcc tgacctctta gtgctatttt ctatttatct 5520
cctctgttct ctgctctctt taaacgttgg aggaagaaac agtacccatc ttacacaaac 5580
tcttcagaaa acagaggaac agactgggcg cggtggctca tacctgtaat ctcagcactt 5640
tggtacgctg aggcagggga tcatttgagg tcgggagttc gagaccagcc tggccaacac 5700
ggcgaaaccc catctctact aaaatacaaa agtagctagg cgtgcaccat acctgtaatg 5760
ccagttactc aggaggctga ggcacaagaa tcccttgaac ctgggaagcg gaggttgcag 5820
tgagccgaga ttgcgccact gcactccagc ctgggcaaca gagtgagacc ctgtctcaga 5880
aaaaaaaaga aagaaagaaa aaatagagga atatttccca acttgttttc gaagccagga 5940
taatcctggt accaaaacca aacaaggaca ttataagaaa agaaaatata gaccaatatt 6000
cctgttagca tagacatgca acagctaacc aattttagca aaccaaacct ggtaatatag 6060
aaaaaaggat aaataggcca gtcgcggtgg ctcacgcctg taatcccagc actttgggag 6120
gctgaggcag gcagatcact tgaggtcagg agtttgagac cagcctgacc aacatggtga 6180
aaccccgttt ctaataaaaa tacaaaaatc aggctgggca cggtggctca cgcctgtaat 6240
```

```
cccagcactt tgggaggccg aggtgggcag atcacgaggt caggagttca agaccagcct  6300
gaccaatgtg gtgaaacgcc atctctacta aaaatacgaa aatcagccgg tgtggtggca  6360
cctgcctgta atcccagcta ctcaggaggc tgaggcagaa ttgcttgaac ccgggaggca  6420
gaggttgcag tgagccaaga tcgtgccact gcactccagc ctgggcgaca gagcaagact  6480
tcatctcaaa aaaaaaaaaa attagctggg catggtggtg ggcacctgaa atcccagcta  6540
ctcgggagtc tgaggcagga gaatcgcttg aacccaggag gcagaagttg cactgagctg  6600
ggatcacacc attgcactcc agcctgggca acagagtgag actccatctc aaaaaaagaa  6660
aaagaaaaag gataaataca ttctaaccaa ataatgttta tctcatgatt gtagctgatt  6720
caacattcaa aaattggcct ggtgcagtag ctcaggcctg taatcccaac attttaggag  6780
gctgaggcag gaagatctct tgagcccagg atttcaagac cagcctgggc aacatagtca  6840
gactggtctt tactgggggg aaaaaaatca gtctgtgtaa ttcaccacat taacaaaggg  6900
aaacataaaa accctatgat catttcaaca gatgtagcaa aagcagttaa tgatatcaac  6960
acatatgcat gattacaaac caaccaacct cctagcaaac tagggaaagg aaacttaact  7020
agtttgataa cagggcgtcc acagtcggag ttccactagc agcatacata atggtagaaa  7080
actcagtgct gctgggggcg gtggctcacg cctgtaatgc cagcgctttg ggaggcctag  7140
gcgggcggat cacgaggtca ggagatcgag actgtcctga ctagcatgct gaaaccccgt  7200
ctctactaaa aatacaaaaa caaaaaatta gccgggcatg gtggcgggcg cctatagtgc  7260
cagctactcg ggaggctgag gcgagagaat ggcgtgaacc cgggaggcgg agcttgcaga  7320
gcctagatcg tgccactgca ctccagcctg ggtgacagag tgagacttcg tctcaaaaaa  7380
aaaaaaaaaa aaaaaagaaa agaaaactca acgctttttc ctctaagatc aggaactaga  7440
aaaggatttg actctcacaa cgttgatacc atactggagg ttttaaccag gcaagaaaaa  7500
gaaataatga gggccgggtg cggtggctca ggcctgtaat cccagcactt tgggaagccg  7560
agacgggtgg atcacgaggt caggagatcg agccatcctg gctaacacgg tgaaaccctg  7620
tctctactaa atatacaaaa aattagccgg gcgtggtggc gggcgcctgt agtcccagct  7680
actcgggagg ctgaggcagg agaatggcgt gaactcaggg ggcggagctt gcagtgagct  7740
gagatcgagc cactgcactc cagcctgggc gacagagcaa gactgtgtct caaaaaaaaa  7800
aaaagaaaaa gaaataatga ttagtggccc gatgtctcac gccagtaatc ccagcacttt  7860
gggaggccga ggtgggcaga tcacctgagg tctggagttg gagaccagcc tgacaaagat  7920
ggtgaaacct cgtctctatt aaaatattaa aaaaatagcc aggcgttggc cgggtacagt  7980
ggctcatgcc tgtaacccca gcactttggg aggccgaggt gggtggatca cctgaggtca  8040
ggagttcaac accagcctgg ccaacatggt gaaaccccat ctctactaaa aatacaaaat  8100
tagccgggcg tagtggcggg cgcctgtaat cccagctact tgggaggctt aggcaggaga  8160
atcgcttgaa cctgggaggc ggaggttgta gtgagccgag attgcaccat tgcactccag  8220
cctgggtgac aaaagcaaaa actccgtctc aaaaaaaaaa gaattagcca ggggtagtgg  8280
tgaacgcctg tagtcccagc tactcaggag gcagaggcag gagaatcact tgaaccccgg  8340
aggcagaggt tgcagtgagc cgagattgtc ccattgcact ccagcctagg cgagaagagc  8400
aaaattccat gtcaaaaaaa aaaaaaaaaa aggaaagaaa aaaaataacg attagaaagg  8460
aagaaatcaa acacattcac agccagtatg attctataca taccatggtc ctaatggggc  8520
caggcgtggt ggctcatgct gtaatcctag cacttttagg aggctgaggc aggtggcttc  8580
cctgggacca gctggccaac atggtgaaac cccaactcta ataaaaatac aaaaaatcag  8640
ccaggcgtgg tgagggcacc tctaatccca gctactcagg aggctgaggc aggagaattg  8700
cttggacctg ggaggcagag gttgcagtga gccgagatcg cgctattgca ctccagcctg  8760
ggcaacaaga gtgaaactcc ggcagggtgt ggtcttacgc ctgtaatccc agcacttcgg  8820
gaggctgagc caggccgatc acctgaggtc aggagtttga gaccaaccta acatggtgaa  8880
accccgtctc tactaaaaat acaagaatta gctgggtgta gtggtgggcg cctgtaatcc  8940
cagctacttg ggaggctgag acagaagaat tgcttgaacc caggaggtgg aggttgcagt  9000
gagctgagat catgccattg cacaccacgc cgggcaacag agcgagattc cgtctcaaaa  9060
aaaaaaaaaa gatgaaactc tatctcaaaa aaaaaaaaaa gtcctaatgg aaaatccata  9120
aaaagctacc aaaactaata aataaatata gcagggttgc aggttacagg gcaatatagt  9180
tatccctcta tctgtagggg cttggttctg ggactcctca cacaccaaac ccacagatgt  9240
ctaagtccca tatataagac ggaatagtat ttaacctaca catatcctcc catatagttt  9300
aaattatcta gattacttac attacccccca tacaatgaaa atgctaatgt acatgcaagt  9360
atgtatgtaa gtacttgtac tatattgttt agggaatcac tggacagata ggccttcaag  9420
actgatacca gcagccactg ttaagattct ggtcaggcct gcccctgttt ggggtctcag  9480
ttgatctcat tgccttccca cccagccaag ggcacctgca tttctcttgg ctccctggcc  9540
atttggaagg cctagttcag cctggcacat ttgtatcctg gcccactgat gctggtaccc  9600
ctgggaaggt cctgctctga aaaacacgga gattttagtt gctactgaag atttgagaga  9660
taaagacagg gagacctgtc tgtagacctg tgtccctcca agtgggattg agactttggg  9720
ccccccattt caggacagca cctcctggcc tgttgactga atagatccct gaaggaggtg  9780
tagttgcatt ttaggagtgg gggtgggagc agtaccactg atccgcacta acaatcacac  9840
agttctctct agaataataa tatagaacaa gtgaaataga acaattgcag aaagagctaa  9900
cctttgttga gctcttactg tgtgcccagc actttcctca actctacatt tcccataata  9960
catagagtac taggtaggcg gggcttgggg gctcacgcct gtaatcccag cactttagga  10020
```

ggccaagggg ggtggatcac ctgaggtcgg gagttcaaga ccagcctgac taacatggtg 10080
aaaccccgtc tctactagaa gtacaaaatt agccaggtgt ggtggcacat gcttgtagtc 10140
ctagctactc agcaggctga ggcaggagaa tcatttgaat ccgggaggag gttgcagtaa 10200
gcggagatag tgccactgta ctccagcctg ggcaataaga gctgagactc cgtctcaaaa 10260
taaaataaaa taaaataaaa taaaataaaa taaaataaaa aaagaaaaga gcctgccatt 10320
aaaggagctg tttggtaggg gatgttttgt cagtgcaaac aacagaaaag tgggctgggc 10380
acagtggttc atgcctgtaa tcccagcact ttgggaggcc aaggcgggcg gatcacctga 10440
agttgggagt tcaagaccag cctgaccaat atggagaaac cccgtctcta ctaaaaatac 10500
aaaattagcc gggcgcagtg gccgatgcct gtaatcccag ctactcggga ggctgaggca 10560
ggagaatcgc ttgaacctgg gaggcagagg ttgcggtgag ccgagatcgc accattgcac 10620
tccagcctgg acgagagcaa aactctgtct caaaaaaaaa aaaaaacaga aaagtgtaac 10680
aaacacttac agtaggcatg tttcttagca aatctgatga caaatttggc ataaagaaag 10740
agagcatccc tgaaaaaaaa aaaaagaaaa agaaagagag catcctgcct gggcaacata 10800
gtgaaaccct gcctctacaa aaaaactcaa aaattggccg ggtgcagtgg ctcacacctg 10860
taatcccagc actttgggag tcggaggcgg gaggatcacc tgaggtcagg agttcgaaac 10920
cagcctggcc aacatggcaa aaccccatct ctactaaaaa tacaaaaaat taatcaggcg 10980
cattggtggg cgcctgtaat cccagctact caggaagttg aggcaagagg atcgcttgat 11040
actgggaggt ggaggttaca gtgagtcgag atcacaccac tgcactctag cctgggtgac 11100
agggcgagac tccgtctcca aaaaaaaaaa gaaaaagaaa aagactaaaa aattagccag 11160
gcaggcctct gtggtcccag ctacttggga ggctgaggca ggagaatcac tgagcccagg 11220
agtggcaggc tgtagtgagc catgattgca ccactgtacc ctagcttggg cttcaaagca 11280
agaccctgcc tcaaaagaaa aaagaaagaa agaaagaaca tggcgggcca ggcacagtgg 11340
ctcacacctg taatcccagc gctttgagag gccgaggcag gtggatcaca aggtcaggag 11400
ttccacacca gcctggccaa catggtgaaa ccctgtctct actaaaaata caaaaaatca 11460
gcaggcaggg tggtaggggc ctgtaatccc agctactcgg gaggctgagg caggagaatt 11520
gcttgaaacc agaaggcaga ggttgcagtg agcctagact gcaccactgc actccagcct 11580
gggcgaaaag agccaaactc catctcaaaa aacaaacaaa aaaacaaaac aaaaaaaaac 11640
atggcagcct ttgaaagctt gtctgggaga aggtgcgatg atggttgcat aacttcgtgc 11700
aagatgctgg tccacacagg ggctgcccct tgctctttct cgctctctta acctctcata 11760
taacaggctt gtgtgttatg cacatttatt gagcccaagc aggtgcaagg cattgtgatc 11820
taatactttg gtcagcaaga caacaagata gatcactgcc ctgcccttag gaagtgtata 11880
tgctattaga ggaaacagat aaaataaaca aggaaaagta tcagacaatg taagtgctat 11940
gagaatgcaa atgaggtgat gtgaattaaa ataggatgac ttaagtctgc acggaaggcc 12000
cctaccccca tgttcctggc tagccaagga accaccagtt gattagcaga gaagggcagc 12060
ccgtctagct agagcttttg gggaagaggg agtggttgtt aagagatgag attaaagaag 12120
ccgagacggg cccttcgtga ggggggggttg taatgcaggg ctgaggagtg tccgaagaga 12180
atgggcaggt gagcggtgag acagttgttc ttccagaagc tttgcagtga aaggaatcaa 12240
agaaatggag ccgtgtatca ggtggggaag ggtgggggcc aagggggtgt ccttccccat 12300
acagagattg caggctgaga atgactatat ccttgttaac aggaggtggg agcagggcac 12360
ggtagctcac acctgtaatc ttggcacttt aggaggcgga ggcgggccga tcacctgaag 12420
taaggagttc gagaccagcc tggccaacat gcaaagccct gtctctacta aaaatacaaa 12480
aattagctgg gtgtggtggt actcgcctgt aatcccagct actcgggaga ctgaggcagg 12540
agaatggctt gaacccggaa ggtagaggtt gcagtgagct gagatcatgc cactgtgctc 12600
cagcctaggt gacagagaga gactccatct caaaaaaaaa aaaaaataca ggaagggagt 12660
tgggaatagg gtgcacattt aggaagtctt ggggatttag tggtgggaag gttggaagtc 12720
cctctctgat tgtcttttcc tcaaagaagt gcatggctgg tgtggggtgg ggcaggagtg 12780
cttgggttgt ggtgaaacat tggaagagag aatgtgaagc agccattctt ttcctgctcc 12840
acaggaagcc gagctgtctc agacactggc atggtgttgg gggagggggt tccttctctg 12900
caggcccagg tgacccaggg ttggaagtgt ctcatgctgg atccccactt ttcctcttgc 12960
agc 12963

<210> 11
<211> 3500
<212> DNA
<213> Homo Sapiens

<400> 11

ctcagaacaa atggcagagg ccagtgagcc cagagatggt gacagggcaa tgatccaggg 60
gcagctgcct gaaacgggag caggtgaagc cacagatggg agaagatggt tcaggaagaa 120
aaatccagga atgggcagga gaggagagga ggacacaggc tctgtggggc tgcagcccag 180
gatgggacta agtgtgaaga catctcagca ggtgaggcca ggtcccatga acagagaagc 240
agctcccacc tcccctgatg cacggacaca cagagtgtgt ggtgctgtgc ccccagagtc 300

```
gggctctcct gttctggtcc ccagggagtg agaagtgagg ttgacttgtc cctgctcctc    360
tctgctaccc caacattcac cttctcctca tgcccctctc tctcaaatat gatttggatc    420
tatgtccccg cccaaatctc atgtcaaatt gtaaacccca atgttggagg tggggccttg    480
tgagaagtga ttggataatg cgggtggatt ttctgctttg atgctgtttc tgtgatagag    540
atctcacatg atctggttgt ttaaaagtgt gtagcacctc tcccctctct ctctctctct    600
cttactcatg ctctgccatg taagacgttc ctgtttcccc ttcaccgtcc agaatgattg    660
taagttttct gaggcctccc caggagcaga agccactatg cttcctgtac aactgcagaa    720
tgatgagcga attaaacctc ttttctttat aaattaccca gtctcaggta tttctttata    780
gcaatgcgag gacagactaa tacaatcttc tactcccaga tccccgcaca cgcttagccc    840
cagacatcac tgcccctggg agcatgcaca gcgcagcctc ctgccgacaa aagcaaagtc    900
acaaaaggtg acaaaaatct gcatttgggg acatctgatt gtgaaagagg gaggacagta    960
cacttgtagc cacagagact ggggctcacc gagctgaaac ctggtagcac tttggcataa   1020
catgtgcatg acccgtgttc aatgtctaga gatcagtgtt gagtaaaaca gcctggtctg   1080
gggccgctgc tgtccccact tccctcctgt ccaccagagg gcggcagagt tcctcccacc   1140
ctggagcctc cccaggggct gctgacctcc ctcagccggg cccacagccc agcagggtcc   1200
accctcaccc gggtcacctc ggcccacgtc ctcctcgccc tccgagctcc tcacacggac   1260
tctgtcagct cctccctgca gcctatcggc cgcccacctg aggcttgtcg gccgcccact   1320
tgaggcctgt cggctgccct ctgcaggcag ctcctgtccc ctacaccccc tccttccccg   1380
ggctcagctg aaagggcgtc tcccagggca gctccctgtg atctccagga cagctcagtc   1440
tctcacaggc tccgacgccc cctatgctgt cacctcacag ccctgtcatt accattaact   1500
cctcagtccc atgaagttca ctgagcgcct gtctcccggt tacaggaaaa ctctgtgaca   1560
gggaccacgt ctgtcctgct ctctgtggaa tcccagggcc cagcccagtg cctgacacgg   1620
aacagatgct ccataaatac tggttaaatg tgtgggagat ctctaaaaag aagcatatca   1680
cctccgtgtg gcccccagca gtcagagtct gttccatgtg gacacagggg cactggcacc   1740
agcatgggag gaggccagca agtgcccgcg gctgccccag gaatgaggcc tcaaccccca   1800
gagcttcaga agggaggaca gaggcctgca gggaatagat cctccggcct gaccctgcag   1860
cctaatccag agttcagggt cagctcacac cacgtcgacc ctggtcagca tccctagggc   1920
agttccagac aaggccggag gtctcctctt gccctccagg gggtgacatt gcacacagac   1980
atcactcagg aaacggattc ccctggacag gaacctggct ttgctaagga agtggaggtg   2040
gagcctggtt tccatccctt gctccaacag acccttctga tctctcccac atacctgctc   2100
tgttcctttc tgggtcctat gaggaccctg ttctgccagg ggtccctgtg caactccaga   2160
ctccctcctg gtaccaccat ggggaaggtg gggtgatcac aggacagtca gcctcgcaga   2220
gacagagacc acccaggact gtcagggaga acatggacag gccctgagcc gcagctcagc   2280
caacagacac ggagagggag ggtcccactg gagccttccc caaggacagc agagcccaga   2340
gtcacccacc tccctccacc acagtcctct ctttccagga cacacaagac acctccccct   2400
ccacatgcag gatctgggga ctcctgagac ctctgggcct gggtctccat ccctgggtca   2460
gtggcggggt tggtggtact ggagacagag ggctggtccc tccccagcca ccacccagtg   2520
agccttttc tagcccccag agccacctct gtcaccttcc tgttgggcat catcccacct   2580
tcccagagcc ctggagagca tggggagacc cgggaccctg ctgggtttct ctgtcacaaa   2640
ggaaaataat ccccctggtg tgacagaccc aaggacagaa cacagcagag gtcagcactg   2700
gggaagacag gttgtcctcc caggggatgg gggtccatcc accttgccga aaagatttgt   2760
ctgaggaact gaaaatagaa gggaaaaaag aggagggaca aaagaggcag aaatgagagg   2820
ggaggggaca gaggacacct gaataaagac cacacccatg acccacgtga tgctgagaag   2880
tactcctgcc ctaggaagag actcagggca gagggaggaa ggacagcaga ccagacagtc   2940
acagcagcct tgacaaaacg ttcctggaac tcaagctctt ctccacagag gaggacagag   3000
cagacagcag agaccatgga gtctccctcg gcccctcccc acagatggtg catcccctgg   3060
cagaggctcc tgctcacagg tgaagggagg acaacctggg agagggtggg aggagggagc   3120
tggggtctcc tgggtaggac agggctgtga gacggacaga gggctcctgt tggagcctga   3180
atagggaaga ggacatcaga gagggacagg agtcacacca gaaaaatcaa attgaactgg   3240
aattggaaag gggcaggaaa acctcaagag ttctattttc ctagttaatt gtcactggcc   3300
actacgtttt taaaaatcat aataactgca tcagatgaca ctttaaataa aaacataacc   3360
agggcatgaa acactgtcct catccgccta ccgcggacat tggaaaataa gccccaggct   3420
gtggagggcc ctgggaaccc tcatgaactc atccacagga atctgcagcc tgtcccaggc   3480
actggggtgc aaccaagatc                                               3500
```

<210> 12
<211> 18
<212> DNA
<213> Homo Sapiens

<400> 12

```
tctaacctcg ggctgtgc    18
```

<210> 13
<211> 18
<212> DNA
<213> Homo Sapiens

<400> 13

gcacagcccg aggttaga 18

<210> 14
<211> 18
<212> DNA
<213> Homo Sapiens

<400> 14

ggcagggccg gggccaga 18

<210> 15
<211> 18
<212> DNA
<213> Homo Sapiens

<400> 15

tctggccccg gccctgcc 18

<210> 16
<211> 18
<212> DNA
<213> Homo Sapiens

<400> 16

agatatatcg gagtctgg 18

<210> 17
<211> 18
<212> DNA
<213> Homo Sapiens

<400> 17

ccagactccg atatatct 18

<210> 18
<211> 18
<212> DNA
<213> Homo Sapiens

<400> 18

caggctcccg gggcaggg 18

<210> 19
<211> 18
<212> DNA
<213> Homo Sapiens

<400> 19

ccctgccccg ggagcctg 18

<210> 20
<211> 18
<212> DNA
<213> Homo Sapiens

<400> 20

taagtgctcg gagttaat 18

<210> 21
<211> 18
<212> DNA
<213> Homo Sapiens

<400> 21

attaactccg agcactta 18

<210> 22
<211> 18
<212> DNA
<213> Homo Sapiens

<400> 22

ggagggggcg agctggga 18

<210> 23
<211> 18
<212> DNA
<213> Homo Sapiens

<400> 23

tcccagctcg ccccctcc 18

<210> 24
<211> 18
<212> DNA
<213> Homo Sapiens

<400> 24

ccttgagccg gcctaaag 18

<210> 25
<211> 18
<212> DNA
<213> Homo Sapiens

<400> 25

ctttaggccg gctcaagg 18

<210> 26
<211> 18
<212> DNA
<213> Homo Sapiens

<400> 26

ctgtcagtcg tggaagtg 18

<210> 27
<211> 18
<212> DNA
<213> Homo Sapiens

<400> 27

cacttccacg actgacag 18

<210> 28
<211> 18
<212> DNA
<213> Homo Sapiens

<400> 28

aagtgcccgc ggctgccc 18

<210> 29
<211> 18
<212> DNA
<213> Homo Sapiens

<400> 29

gggcagccgc gggcactt 18

<210> 30
<211> 18
<212> DNA
<213> Homo Sapiens

<400> 30

ccctgagccg cagctcag 18

<210> 31
<211> 18
<212> DNA
<213> Homo Sapiens

<400> 31

ctgagctgcg gctcaggg 18

<210> 32
<211> 3315
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 32

tttttttattt tttattgtta tttatttagc gttgtgtagt agtttagttg cgtgtttgtc 60
gggaggggtt gttaagtgtt ttgtttattg gttgtttttc gaatttttgt tattttacgt 120
ataaatatat ttatatattt tttttgttta gtttatatat tgagttattc gtatatgcga 180
gtatattttt tttttttttt ttattttttc ggtttttgat ttttataagt ttatggaata 240
tttttggaaa gacgtttttg atttagtagg gtaggtttgt tttgattttt ttttttgtag 300
ttttagtatt ttgagaaagt aatttatttt tttggttagt gtttgtattt tagtagggag 360

```
atgaggattg ttgtttttta tgggggtatg tgtgtgtttt tttttttttt taggatttgt   420
aggatttttt gtgttatttg tatataattt ggtaggttta tatttttttaa gagttttatg   480
aagtgttttt tgtatgtgtt ttaaaaaggt atttgaaaat tgaaagtgtg atttatggaa   540
attaaattat ttgtaaaaaa ttgttttgga aagtaatgat tgttggttat aaagggaaat   600
atttgcgatg tatttaatgt gtttttaatt ttttatttgt tgataattta tagttattaa   660
tgttaaattc gattttggtt ttagttatat ttgtatattg tttaataatg gtttattttt   720
gtaagaatta gataaaatgt atatttgata taaaatagtt aaaaatgtaa tttttagtaa   780
tagtaagttt ggtatttaga tagattatga atatttcgtt agatattttg ttgggtgttt   840
gggatagtaa ttaaaataaa gtattgatag ttgtattaga gtttattagg ttgtagtaaa   900
ggaagtttat ttaaaagtat aaattattta agattataga cgtatgatat attttattta   960
tttttgttt ttttaatatg tatatatata tatatatata tatatatata tatatatgtg   1020
tgtgtgtatg tgcgtgtgta tgtttaattt ttaatttagt taaaaatttt tttttatttg   1080
tttttatttt ggatatttga ttttgtatat tttagtttaa gtgaatcgag aagatcgagt   1140
tgtaggatta aaggatagat atgtagaaat gtattttaaa aatttgttag ttggattaga   1200
tcgataatgt aatataattg ttaaagtttt ggttcgtgat ttgaggttat gtttggtatg   1260
aaaaggttat attttatatt tagtttttg aagttttggt tgtataatta atttgtggaa   1320
ggtatgaata tttatgtgcg ttttaattaa aggtttttt gaattatttt ttatatgaga   1380
atttttaatg ggattaagta tagtattgtg gtttaatata aatatataag ttaggttgag   1440
agaattttag aaggttgtgg aagggtttat ttattttggg agtattttgt agaggaagaa   1500
attgaggttt tggtaggttg tatttttttg atggtaaaat gtagtttttt ttatatgtat   1560
atttgaatt ttcgtttttt tttttttaga tgtttttttgt tagtttttttt agttgttaaa   1620
tatagttgtt tgtggttggt tgcgtatgta atcgtatatt ttattttatt tgttttattt   1680
cggttatagt gtagtttttt ttagggttat tttatgtata tattacgtat ttttagttaa   1740
cgaggagggg gaattaaata gaaagagaga taaatagaga tatatcggag tttggtacgg   1800
ggtatataag gtagtatatt agagaaagtc ggtttttgga ttcgtttttc gcgtttattt   1860
taagtttagt tttttttggg ttatttttag tagattttcg tgcgttttcg tttttttggtc   1920
gtgaaattta gtttttattt agtagcgacg ataagtaaag taaagtttag ggaagttgtt   1980
ttttgggatc gttttaaatc gagttgtgtt tggagtgatg tttaagttaa tgttagggta   2040
aggtaatagt ttttggtcgt tttttagtat ttttgtaatg tatatgagtt cgggagatta   2100
gtatttaaag ttggaggttc gggagtttag gagttggcgg agggcgttcg ttttgggatt   2160
gtatttgttt tcgtcgggtc gttcggtttt atcggattcg taggttttcg gggtagggtc   2220
ggggttagag ttcgcgtgtc ggcgggatat gcgttgcgtc gtttttaatt tcgggttgtg   2280
tttttttttt aggtggttcg tcggtttttg agtttttttgt tttgcgggga tacggtttgt   2340
atttgttcg cggttacgga ttatgattat gatttttttat attaaagtat ttgggatggt   2400
tttattgtat tagatttaag ggaacgagtt ggagtttttg aatcgttcgt agtttaagat   2460
ttttttggag cggtttttgg gcgaggtgta tttggatagt agtaagttcg tcgtgtataa   2520
ttatttcgag ggcgtcgttt acgagtttaa cgtcgcggtc gtcgttaacg cgtaggttta   2580
cggttagatc ggtttttttt acggtttcgg gtttgaggtt gcggcgttcg gttttaacgg   2640
tttgggggggt tttttttttat ttaatagcgt gttttcgagt tcgttgatgt tattgtattc   2700
gtcgtcgtag ttgtcgtttt ttttgtagtt ttacggttag taggtgtttt attatttgga   2760
gaacgagttt agcggttata cggtgcgcga ggtcggttcg tcggtatttt ataggtattc   2820
gcgttcgcgt cgttcgtcgg ggtggtcgtc gcgttcggta ggagggaggg agggagggag   2880
ggagaaggga gagtttaggg agttgcggga gtcgcgggac gcgcgattcg agggtgcgcg   2940
tagggagttc ggggcgcgcg gtttagttcg ggggttttgc gtgtagttcg cgttgcgttt   3000
agagttaagt tttttcgtcg ggtagttgaa aaaaacgtat tttttattta tttatcgttc   3060
gtgcgagagg tagattcgaa agttcgggtt ttttaataaa atatacgttg gaaaattaga   3120
taaagtagta gttatttgtg ggggaaaata tttttaggta aataaatacg gggcgttttg   3180
agttatttgg gaaggtttcg tttttggtat ttaaagttgg gggtgtttgg agttagtaga   3240
gtttagtaga gttttattta ttttttttaat gtttttgttt aatgtgtttt ttaaattttt   3300
ttttatttag attat                                                    3315
```

<210> 33
<211> 3315
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 33

```
atagtttaga tgaaaggaaa tttggggagt atattaaata aaaatattaa aaggataaat   60
aaaatttgt tgagttttgt taattttaaa tatttttaat tttaaatgtt aagagcgaga   120
```

```
tttttttaag tgatttaaag cgtttcgtgt ttatttgttt ggaggtgttt ttttttataa     180
ataattgttg ttttgtttgg tttttttaacg tgtgttttgt taggaagttc gggttttcgg     240
gtttgttttt cgtacggacg gtaagtgggt ggagagtacg ttttttttag ttgttcggcg     300
agagaatttg attttgaacg tagcgcgggt tgtacgtaga attttcgggt tgggtcgcgc     360
gtttcgggtt ttttgcgcgt attttcgggt cgcgcgtttc gcggttttcg tagtttttta     420
ggtttttttt tttttttttt tttttttttt tttttgtcg ggcgcggcgg ttatttcgac     480
gggcggcgcg ggcgcgggta tttgtagaat gtcggcgggt cggtttcgcg tatcgtgtag     540
tcgttgggtt cgttttttag gtagtagggt atttgttggt cgtggggttg taggaaaggc     600
gatagttgcg gcggcgggtg tagtagtatt agcgggttcg gagatacgtt gttgagtggg     660
gggaaatttt ttaggtcgtt ggagtcgaac gtcgtagttt tagattcggg gtcgtagggg     720
aggtcggttt gatcgtagat ttgcgcgttg gcggcggtcg cggcgttgaa ttcgtaggcg     780
gcgttttcgg ggtagttgta tacggcgggt ttgttgttgt ttaggtatat ttcgtttagg     840
ggtcgtttta gggggatttt gagttgcgga cggtttaggg gttttagttc gtttttttgg     900
atttgatgta gtagggttat tttagatgtt ttggtgtgga gggttatggt tatggttcgt     960
ggtcgcgggt agggtgtaga tcgtgttttc gtagggtaga aggtttagaa atcggcgggt    1020
tatttggaaa aagagtatag ttcgaggtta gaggcgacgt agcgtatgtt tcgtcgatac    1080
gcgagttttg gtttcggttt tgtttcggga gtttgcgggt tcggtgaagt cgggcgattc    1140
gacgggagta agtgtagttt taggacgaac gtttttcgtt agtttttggg ttttcgggtt    1200
tttaatttta agtattggtt tttcgagttt atatgtatta taaaggtgtt ggaggacggt    1260
tagggattgt tgttttgttt tgatattggt ttaaatatta ttttaggtat aattcgattt    1320
ggagcgattt taaagagtag tttttttgaa ttttatttta tttgtcgtcg ttgttggata    1380
gaggttgagt tttacggtta gggggcgggg gcgtacgagg atttgttaaa ggtggtttag    1440
ggaagattgg gtttaaaata aacgcgaaag acggatttag gggtcggttt tttttaatgt    1500
gttgttttat gtgtttcgtg ttagatttcg atatattttt gtttgttttt tttttttgttt    1560
gatttttttt tttcgttggt tagaaatacg tagtgtgtat ataggatgat tttggggagg    1620
attatattgt aatcgagata gggtagatag aatggggtgt gcggttgtat acgtagttag    1680
ttatagatag ttatatttag tagttggggg aattgatagg gggtatttga ggggaagggg    1740
gcggagattt agggtatata tataggaaga gttgtatttt gttattagga gaatgtaatt    1800
tgttaggatt ttagtttttt tttttgtaaa atgtttttaa agtagataga ttttttttata    1860
atttttttgag atttttttag tttgatttgt gtgtttatgt tggattatag tattgtattt    1920
ggttttatta ggaattttta tgtgaaggat gatttagaaa aatttttggt tagggcgtat    1980
atgggtgttt atgtttttta taggttggtt atgtaattaa aattttagaa aattgaatat    2040
aaaatgtgat tttttttatat taaatataat tttaggttac gaattaaagt tttggtaatt    2100
atgttatatt gtcggtttgg tttagttaat agatttttaa aatgtatttt tgtatgttta    2160
tttttttagtt ttataattcg atttttttcgg tttatttggg ttaggatatg tagaattaaa    2220
tatttagatg aaaaataaat agaaaaaaagt ttttaattga attaaaagtt aaatatgtat    2280
acgtatatat atatatatat atatgtgtat atatatatat atatatatat atatatatat    2340
taaggagata aaaaataggt gaagtatatt atgcgtttat aattttggat agtttatatt    2400
tttgaataaa ttttttttgt tgtagtttaa tagatttttga tataattatt aatattttgt    2460
tttaattgtt attttaaata tttaatagag tatttgacga agtgtttatg gtttatttaa    2520
atgttaagtt tattgttatt aagagttata tttttgatta ttttatatta agtatatatt    2580
ttatttaatt ttttataaaaa tagattattg ttggataata tgtaaatgta gttgaagtta    2640
aaatcgagtt tagtattaat gattatagat tgttagtaaa taaagggtta aaaatatatt    2700
aggtgtatcg tagatatttt tttttatggt tagtaattat tattttttaa agtaattttt    2760
tatagatgat ttaattttta taaattatat ttttaatttt taaatgtttt tttaaaatat    2820
atgtaaaaag tattttatag ggtttttaaa aaatgtgaat ttgttaaatt atatgtaaat    2880
ggtataaaga attttataag ttttgaaaga aaaaggagat atatatatat ttttatggag    2940
aatagtaatt tttattttttt tgttaggata tagatattag ttagaaaggt aagttgtttt    3000
tttaaaatgt taaagttata gagagagaaa ttaaaataag tttattttgt tggattaaga    3060
acgttttttt agaaatgttt tatgggtttg tagaagttaa gggtcgagag agtgagaagg    3120
aaggaaggaa tgtgttcgta tgtgcgagtg gtttagtgtg tgaattaggt agagagagtg    3180
tgtggatgtg tttgtgcgtg gaatggtagg gattcgggaa gtagttagta ggtagggtat    3240
ttggtagttt ttttcggtag atacgtagtt gggttattgt atagcgttgg atgaatggta    3300
gtggggagtg agggg                                                      3315
```

<210> 34
<211> 7369
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 34

tagaagtttt tttttagagt gtgtttgggt atatatttaa gtgtatggtt gtaaattttt 60
ttttttaaag tattgaatag tattagatat ttagtaggta tttaagaaat attgaatgtc 120
gtggtggtgg tgagttagaa gttataaaaa aaattttttt ttaaaaataa taataaaaag 180
aattatttta ttgtgaagtt tagtattata aaaatttaaa taatttatta taagttttta 240
ttaaaaaaaa tttttttttt aaagtaaata gatagataat gtttagttta tttgaaatgt 300
ttgaaagtag aggggtttta aggtagtggg agaaggtgtt tgttttttgt tggatatttg 360
ataattagtt ttttggatgg tttggatgta taggagcgaa ggtgtagata gtagtggggt 420
ttagagtggg gttttgaggt tgtgtcgtgg tttttttggg gtttagttat aattttggtt 480
tgattttagg gcgaggtagg ttaagggggt ttgttattgt gttttttttat ttttatttgg 540
gtttttattt ttatagtaga ggagaaagaa gtttgttttt ttcgaggtta gttgcgttag 600
aggaagaaga ttgggtatgt ttgggtagag atttttagat tttgagtagt ttgagatgtt 660
agtaattgta gttgttttaa gtttgggttt tgttttttag tgggattttt gtttagatga 720
ataatttatt ttttgtaatt ttttaaaagt aaaattgtaa atgttttagg tatagaaagg 780
aggtaaaggt gaagtttagg ggaggttagg ggtgtgaggt agatgggagc ggatagatat 840
attatttatt tttgtgtttg ttagaagaat tagtagatat ttttagaatt gtttttttatt 900
tatgttattt ttataaatta tttgtaaatg agggttattt ggtatttttg ttattttgga 960
gttatagaaa taaaggatga taagtagaga gtttcgggta ggaggtaaaa gttttgtgtt 1020
ttaattatag ttattttttt gttgtatgat ttgagttagg ttattagatt tttttgagtt 1080
ttagtttttt tagtagtgta tacgggttat gtgggggagta tttaggagat agataattta 1140
ttcgttaaat tttttttttt ttggttaata aagttgttgt aattataggg attttttttg 1200
tttaggtgag tgtagggtgt agggagattg gtttaatgtt taattttttt gtttttttgg 1260
agattaggtt gttttttttt ggtagttttt ttaatttttt tttttcgga agtatgtgat 1320
aattaataat tttgtatatt taagtttagt ggattttaat tttttattt gtgaaataaa 1380
cgggattgaa aaattatttt ggttttaaga tgttttgttg gggtgtttag gtgttttagg 1440
tgtttttggg agaggtgatt tagtgaggga ttagtgggaa tagaggtgat attgtggggt 1500
tttttttggaa attgtagaga ggtgtatcgt ttttataatt tatgaatttt tatgtattaa 1560
tgttattttt ttgatttttt tagttgtatt gggtaaattt ttgtttgtta gagtgggtta 1620
gcggtgagtt agaaaggggg tttattttaa tagtgttgtg tttttttgga gagtgttaat 1680
ttatttttta agtaaaaaaa gttagatttg tggtttattt cgtgggggaaa tgtgtttagc 1740
gtattaacgt aggcgaggga ttgggggagg agggaagtgt tttttgtag tacgcgaggt 1800
ttcgggatcg gttggtttgt tggaattcgg ttaggtttag ttggttcggc gttgggtagt 1860
taggagtttg ggtttcgggg agggcggttt cgggcggcgc ggtgggtcga gcgcgggttt 1920
cgttttttttg aggcgggttc gggcggggcg gttgtatatt agggtcgcgt tgagttgcgt 1980
tagttgaggt gtgagtagtt gtcgaagtta gtttttttgtg gagtcggagt tgggcgcgga 2040
ttcgtcgagg tatcgaggta tttagaggag gtgagagagc ggcggtagat aataggggat 2100
ttcgggtcgg cggtttagag tcgagttaag cgtgttcgcg tgtgtttttg cgtgttcgcg 2160
aggatgcgtg ttcgcgggtg tgtgttgcgt ttataggtgt ttttgcggta ggtgaatgac 2220
gggcgtgggt cggtgcgcgt tcggtttgcg tatacggtgt ttttaagtgc gcgggtgacg 2280
agagtcggga tgtgtcggag atttcggggc ggagagcggg attataagta taggaatttt 2340
tggttacgtt tttcgttttt ggaaatttag ttggggcgag ggagggcgtg gacgggatcg 2400
ttttgggagt tcgtttttgg ttgcggttgg ttttaggttt taggcgtagt ttgttcgcgg 2460
cgtggggatg aagttcgtgt ttttggaggg gtttaggaag ggcgaggaaa gcggagtgga 2520
gtaagttcgt ttaggatcgg tttcgggtgg ttttgggatt taatttgcgt cgttttggtt 2580
taggttttag gtttaggttt tttacgttat tgtgtttatt atttggttga gcgttgaggt 2640
tagcgcgggt tgttttttgg tttttgggaa tgtgttagga ttcgtttttt aaggattagc 2700
gaggaggtga tttattgtga taaggagatt ttagggaacg gattgtatga ggttagaatt 2760
tcgttcggga tggggtatag cgggatttta gaagtttttt tttttgtttt ttcgcggttt 2820
tcgttttttt atcggtatag tgatttattt ggttggaata gtttgttttt aaggaagtcg 2880
ggtattggag gttcgggata tcgcgtcggg ttttcgtttc gcggcgcgtt gtaggggtcg 2940
gggagttacg gttttgtttt gggcgggttt taattagttt gttagtcggg gaagggtaag 3000
ggtttttttt attttttttt tatcgcggtc gggagaatcg cggtttagtt tgttttcggg 3060
tcggggcgtt ggatttcggg gcgggagcgg agtttacgtt tggatgggag gcgggggaggg 3120
tttatgtttt tgaggggtgg ggggtttggg gggtacgacg ttgtttaggg tttttattag 3180
ttgtttcggg ggtttagggt ttttcgattt agtttagatt tttttttcga aagttatagg 3240
gttgagcgga gtaggggggc gagtcgtttt ttggggcgtc gtcgtttggc gcggattata 3300
gcgcgttttt ttcgttttaa atttttgggg gatatttgcg ttttttttcgt gaggaaaagt 3360
attttggagt tgggttagga atttggggcg tttaggtagt tttttttttt tttgtttttt 3420
tttacgtcgc gtttttggga ggatttgcga gcggttttgt tttcgttgtt ttcgtttatt 3480
tttatttttt agggatttga tttatttcgt gttttgggcg tggagataag gtggaggggt 3540
cggttttcgg cgcgcgcgcg cgtgcgtgtt tgcgcgggcg tgtgtgtgtg tgtgtgtgtg 3600
tgtgtgtgtg tgtgtgtttg tgttagagac ggtataagag cgcgcggttt tttaatagcg 3660

gcgggagttt cggaagtttg gtcggtttag cgtgacgtgt tcgcggtttt tcggtttttt 3720
tttatttttt ttttttttat tttagggtga cgcgtagtcg gagtggaagt agttttggcg 3780
ggcgagtagc gttttgtagg aaattgattt attattattt tttttagcgg ttcgaggttt 3840
tgtttacgta ttttttattt cgcgcgtgat tttttggagg tcggcgtttt ttttcggttt 3900
tggcgggaat agtatatagg ttttttcgcg gagtggggtt ggtcggcgcg aatcgtcgcg 3960
gttatttttg ggtttattcg agattaattt ttatgttatt attatttttt taaaggagta 4020
ttttttaggt ttaatagtat ttattgagtt tttattggaa attaaaatat ggttgaagtt 4080
taaggtagga aggttaataa aggaggttat ttttaattgt ttttaaaata agggtttgcg 4140
tttttgagtt ttttttgggt tgaaagttat tatgagtatg agagtagatt ttgatggggg 4200
aggagaggtt tatgagagtt ataagagaag gaggggtggt agaagaggag agggtgtttg 4260
tttagatttt agttttgttt tgaattttcg agagttaggg aatatttagt attttgatga 4320
agttttaggc gggcgttttt tttttgtgtt tatgatgtat tgagatttag aatgtttatt 4380
ttaaatatat tagtgtgttt tcgtttggtt ggtaatttaa gagtgtttat ttgaggaatt 4440
gtgttaaata tttgtttgaa tttttaattt ggattaagtt ggtttcggga ggtagggttt 4500
tagtaattta tattttgaaa aaatttttta ggtgtttttt tttttttttt tttttttttt 4560
tttttttttt tttttttttt tttttttttt tttttttttt tttttttttt tttttttttt 4620
tttttttttt tttttttttt tttttttttt tttttttttt tttttttttt tttttttttt 4680
tttttttttt tttttttttt tttttttttt tttttttttt tttttttttc gatagagttg 4740
tattttgtta tttaggttgg agtgtaatgg tattattttg gatttaagta gtttttttgt 4800
tttagttttt taagtaatcg ggattatagg cgtgattttt tcgtttttat gtttagattt 4860
tttttttttt tttttttttt ttgagatgcg gtttcgtttt gttatttagg ttggagtgta 4920
gtggcgtgat ttcggtttat tgtaagtttc gtttttcggg tttacgttat ttttttgttt 4980
tagtttttcg agtagttggg attataggtg ttgttattat gttcggttaa tttttttttg 5040
tatttttagt agagacgggg ttttatcgtg ttagttagga tggttttaat tttttgattt 5100
cgtgtttcgt ttttttcggt tttttaaagt gttgggatta taggtgtgag atattgtatt 5160
taattattta gttaattttt atttattttt atttttagta gagatagggt tttagttagt 5220
tgtttaggtt agttttggat ttttgggttt aaatgatttt tttatttttg ttttttagag 5280
tattaggatt ataggtataa gttattgttt ttggtttttt taagtgattg tgatgggttt 5340
ttttggttaa gaaattttaa aattagagag ggagtggggt ttaatattat agtataggat 5400
ttagggtaaa taggtttggg tttagatttt ggttgtgtta tttatgaatt gtgtgatgtt 5460
aggtaagtta tttaatttat ttgagttttg gttgtttttt ttgtaaaaag ggagttaata 5520
gatatttatt ttttaggagg attgatattt ttaaattgtt tagaatagtt tttaaatata 5580
aaaatatata aataaatttt aatttatgtt tagtagaggg tggatagagg ttatttgagg 5640
gttttgttta ttgtattggg tgattttttt atggggtagt ggtttttggt ttttttagtt 5700
gtatgattta ggggtaagtt ttatattttt tttatttttt gttttttaaa tttggtgtga 5760
agttattaag agtttttttt tttaattagt tgggacgtga aattgtgggt tttattgatt 5820
ataagtagtg gggtgaggtg gggtggagta gatgtggtat gtgtttcggg ttttttgttt 5880
tatgaggatt tagtagagtt tttattttta gaaattgtaa gttgggattt gtttttagga 5940
aaatttagtt gttgttaagg tcgtgtagtt atttagtttt ggagttaagt tagagtaggt 6000
aggtaggtgt tagggttttt ttatgggtaa atttattttt cgtttttttt tttttgaagg 6060
gggaggagag gagttaggta gattagttat ttttaatttt ttttttgttt gtaaaacggt 6120
ttttttggat ataggtaata cgaggtaggg gttgttaggt gtttagattt tagattattt 6180
gatgtgtttg gtaggatgtg gtttagtttg ggagaaatta ttttttgcgt tgtttcgttc 6240
ggtttttttt tatttttagg ttattcgttt gacgatattt ttgggaaagg tttttagttt 6300
atagtatttg ttagttgttg tttgaaggag gtagttggta gggggaagtg atagggggga 6360
ggtttagtaa aattgaaggt agagaggaat aattatattt ttgtttttaa tgtatttttt 6420
tatacgaagt gttgttggta cgttatttat attaatttag ttaattttta tgtttatttt 6480
ttgagatagt tattattatt atttttattt tatagatgag gaaattagag tttagataag 6540
ttaagttgtt tgtttagggt tatttagtaa aatttggatt ttagtttagg tgatttggtt 6600
ttagagtttt tttgtttaat tattaggata tagtttttta tttagttttg ttttgtttgt 6660
tttgttgtat ggattttgtg attaattttt tgagtatgtg tttgtagtta tgttttttaa 6720
atttgtatat ggttttattt atggatgagg aaattgagat ttagagatat taagtggttt 6780
tttaaagttt acgtagtaat tggtagagtt aggattataa ttcgggtgtt ttttgtttta 6840
aagtttcggg tatttttatt tggtagagta gggttatttt atttggggat ttgggtcggg 6900
ggatttagga ggttggagga attgttagat tgtttttttt tttgggaatt gattttttgg 6960
ttagggttgc gattaggaaa ttgttggatt ttggtaattt atatatattt ggggggtatt 7020
tatatttatg agggatattt ttggggggaa aataaattga ttttagttga taatatttgg 7080
tggtaaatag gattttggtt tttgtttttg taatagattt gtttttgttg atattagttt 7140
gttttttagt tgtttgtttt tttagtgatt ttggtgtgtt aggttggttg agttttgttg 7200
gtgggggtta ggttttttgt gggaaggaag taggaagatt agttggaagg agtgagagag 7260
attttttggt aggaagacgt tatttgaggt gatatagtaa agttcggtta ggtaatatag 7320
tgtttaattt tcgtcgtgat tagggttttt tttgtatttt tgttgtagg 7369

<210> 35
<211> 7369
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 35

```
tttgtagtag agatataagg aaggttttgg ttacggcgga gattagatat tatgttattt      60
ggtcgggttt tgttgtgtta ttttaggtga cgttttttta ttagagggtt tttttttattt     120
tttttagttg gttttttttgt ttttttttta taggaggttt gatttttatt agtagagttt     180
agttagtttg gtatattaag gttattggga gagtaggtaa ttgaagggta agttaatgtt     240
aataaaggta agtttattgt aagagtaagg attagggttt tgtttgttat taggtattat     300
tagttaaaat taatttgttt tttttttaga ggtgtttttt atgggtgtga atgtttttta     360
aatatgtgtg aattgttaga gtttagtagt tttttaatcg tagttttggt tagaaggtta     420
atttttaaaa gaagaaatag tttgatagtt tttttagttt tttaagtttt tcgatttaga     480
tttttaagta gggtaatttt gttttgttaa gtaaaagtat tcgggatttt ggggtaaaaa     540
gtattcgggt tgtggtttta gttttgttag ttattacgta agttttaaaa agttatttaa     600
tgtttttagg ttttagtttt tttatttata aatggggtta tgtataagtt taaagagtat     660
ggttatagat atatatttaa gaaattgatt atagagttta tgtagtaagg tagatagaat     720
agagttgaat gaaaggttgt attttggtgg ttaagtagga gggttttgga gttagattat     780
ttgggttgga gtttaggttt tattaggtga ttttgggtaa gtaatttaat ttgtttgagt     840
tttagttttt ttatttataa aatggggata gtaatagtga ttgttttaga ggatagatat     900
gagaattaat tgagttaatg taggtaacgt gttagtagta tttcgtatag agaagtgtat     960
tgaaaataga agtatgatta tttttttttg tttttagttt tattgagttt tttttttatt    1020
attttttttt gttaattatt tttttagat agtagttgat aggtgttgta ggttgagggt     1080
ttttttaag gatgtcgtta ggcgggtggt ttaggggtaa ggaggggtcg ggcggggtag     1140
cgtaagggat gattttttttt aggttgagtt atattttgtt aggtatatta ggtgatttga   1200
agtttagata tttggtagtt tttgtttcgt gttgtttgtg tttaaggaaa tcgttttgta    1260
ggtaaaaaga aaattaaagg tggttggttt atttggtttt tttttttttt ttttaggaga    1320
gggaaaacgg agagtgagtt tgtttatgag ggagttttgg tatttatttg tttgttttgg    1380
tttgatttta gggttgagtg attgtacgat tttggtagta attggatttt tttagggata    1440
agttttaatt tgtagttttt gggggtgaaa gttttgttga gtttttatga ggtaggaagt    1500
tcgggatata tgttatattt gttttatttt attttatttt attgtttgtg attagtggag    1560
tttatagttt tacgttttag ttggttggga gaggaggttt ttggtaattt tatattaagt    1620
ttaaagggta ggagatggaa gagatatgag atttgttttt gagttatata gttaaaaagg    1680
ttaaaggtta ttgttttata aaggggttat ttagtatagt ggatagagtt tttaaataat    1740
ttttatttat tttttgttag gtatgagttg ggatttattt atatattttt atgtttgggg    1800
gttgttttaa gtagtttaaa aatattaatt tttttaaaaa gtggatattt attagttttt    1860
tttttataga agaggtaatt aaggtttaga taagttaagt aatttgttta atattatata    1920
gtttataagt ggtatagtta ggatttgaat ttaggtttgt ttgttttgag ttttgtgttg    1980
tagtattgaa ttttattttt tttttaattt tgaggttttt taattagaga ggtttattat    2040
aattatttgg ggaggttagg ggtagtggtt tatgtttgta attttaatat tttgggaggt    2100
agaggtggga gaattatttg agtttaaggg tttaagatta gtttgggtaa ttagttgaga    2160
ttttgttttt attaaaaata aaaataaata aaaattagtt gggtggttgg gtgtagtgtt    2220
ttatatttgt aattttagta ttttgggagg tcgaggaggg cggagtacga ggttaggaga    2280
ttgagattat tttggttaat acggtgaaat ttcgttttta ttaaaaatat aaaaaaaaat    2340
tagtcgggta tgatggtagt atttgtagtt ttagttattc gggaggttga ggtaggagaa    2400
tggcgtgaat tcgggaggcg gagtttgtag tgagtcgaga ttacgttatt gtattttagt    2460
ttgggtgata gagcgagatc gtattttaaa aaaaaaaaaa aaaaaaaaaa aatttgggta    2520
tgggggcggg gggattacgt ttgtggtttc ggttatttgg gaggttgaaa taggaggatt    2580
atttgagttt aggatggtgt tattgtattt tagtttgggt gatagagtgt aattttgtcg    2640
aaagaaaaga aagaaagaga gaaagagaaa gaaagagaga aagagaaagg aagaaagaaa    2700
gaaagaaaga aagaaagaaa gaaagaaaga aagaaaagaa agaaaaagaa agaaagaaag    2760
aaaaagaaag aaagaaagaa agaaagaaag aaagaaagaa agaaagaaag aaagaaaaaa    2820
agaaagaaag aaaagtattt agggagtttt tttaaaatat agattgttga ggttttgttt    2880
ttcgagatta atttaattta gattgaagat ttaagtaagt gtttggtata atttttttaga   2940
tgggtatttt tgggttgtta gttaagcgga gatatattgg tatgtttgaa atggatattt    3000
tgggttttaa tatattatag gtataaggag gaggcgttcg tttagggttt tattaaggtg    3060
ttggatattt tttggttttc gggagtttaa gataggatta ggatttaggt aggtattttt    3120
ttttttttta ttattttttt ttttttttatg gtttttatag gttttttttt ttttattaaa   3180
```

```
atttgttttt atgtttataa taatttttag tttaaagaaa atttagaaac gtaaattttt   3240
gttttagaaa taattaaaaa tagtttttt tattggtttt tttgttttag attttagtta   3300
tattttaatt tttagtaaga gtttagtgaa tattgttgaa tttaaggagt gttttttga   3360
aggggtggta atggtatagg ggttgatttc ggatgagttt aggagtagtc gcggcggttc   3420
gcgtcggtta gttttatttc gcgggaaagt ttgtgtgtta ttttcgttag ggtcgggagg   3480
gggcgtcggt ttttaggaaa ttacgcgcgg agtgggaggt gcgtgggtag agtttcggat   3540
cgttggaggg agtagtgatg agttagtttt ttgtaaggcg ttgttcgttc gttaaaattg   3600
tttttatttc ggttgcgcgt tattttgggg tggggagggg gagaatggga ggggatcggg   3660
gggtcgcgaa tacgttacgt tgagtcggtt aggttttcga aattttcgtc gttgttggga   3720
aatcgcgcgt tttgtgtcg tttttgatat agatatatat atatatatat atatatatat   3780
atatatatac gttcgcgtag atacgtacgc gcgcgcgcgt cgggagtcgg tttttttatt   3840
ttatttttac gtttaaagta cgggatgagt tagattttg gaaaataaaa atagacggga   3900
gtaacgaaaa taaaatcgtt cgtaagtttt tttagaaacg cgacgtggag ggaggtaagg   3960
agaggggaag ttgtttgggc gttttaagtt tttaatttag ttttaagatg ttttttttta   4020
cgaagagggc gtaagtgttt tttaggggtt tgggacggag aggacgcgtt gtggttcgcg   4080
ttaggcggcg gcgttttagg gggcgattcg ttttttgtt tcgtttagtt ttgtagtttt   4140
cggagaggga atttgggtta ggtcgggaag ttttgagttt tcgaggtagt tgatagaggt   4200
tttgagtagc gtcgtgtttt ttagattttt tattttttaa agatatgaat ttttttcgtt   4260
ttttatttag gcgtgggttt cgttttcgtt tcggagttta gcgtttcgat tcgaggatag   4320
gttgggtcgc gattttttcg gtcgcggtgg gaaagaggta gaggagattt ttgttttttt   4380
tcgattgata ggttggttag agttcgttta gagtagggtc gtgattttc gatttttata   4440
gcgcgtcgcg gagcggggat tcgacgcggt gtttcggatt tttagtgttc ggtttttttg   4500
ggaataaatt gttttagtta aataggttat tgtgtcgatg ggaggacgga gatcgcgaag   4560
gggtagggga gagggttttt ggagtttcgt tgtattttat ttcgggcggg gttttgattt   4620
tatatagttc gtttttgggg gttttttgt tatagtgagt tattttttcg ttagttttta   4680
ggggacgggt tttggtatat ttttaagggt taggaaatag ttcgcgttga ttttagcgtt   4740
tagttaggtg gtggatatag tggcgtaaag gatttgaatt tgggatttgg gttagggcgg   4800
cgtagattgg atttagagt tattcgggat cgattttaga cgaatttatt ttatttcgtt   4860
tttttcgttt tttttgggtt tttttaggga tacggatttt atttttacgt cgcgagtaaa   4920
ttgcgtttgg ggtttggagt taatcgtagt taaaggcgag tttttagaac ggtttcgttt   4980
acgttttttt tcgttttagt tgggttttta ggggcgggga gcgtgattag ggattttgt   5040
atttgtaatt tcgtttttcg tttcggggtt ttcggtatat ttcgattttc gttattcgcg   5100
tatttagaga tatcgtgtgc gtaagtcgag cgcgtatcga tttacgttcg ttatttattt   5160
gtcgtagaaa tatttgtgaa cgtagtatat attcgcgaat acgtattttc gcggatacgt   5220
agggatatac gcgggtacgt ttggttcggt tttgggtcgt cggttcgggg tttttttgttg   5280
tttgtcgtcg tttttttatt tttttgagt gtttcggtgt ttcggcgaat tcgcgtttag   5340
tttcggtttt ataaggaatt gatttcggta gttgtttata ttttagttgg cgtagtttag   5400
cgcggttttg atatataatc gtttcgttcg ggttcgtttt aaggaggcgg gattcgcgtt   5460
cggtttatcg cgtcgttcgg gatcgttttt ttcggggttt aggtttttgg ttgtttagcg   5520
tcgagttagt tgagtttggt cgagttttag taggttagtc ggtttcggaa tttcgcgtgt   5580
tgtaggaggg tatttttttt ttttttagt ttttcgtttg cgttggtgcg ttggatatat   5640
tttttttacga agtgagttat aaatttggtt ttttttattt ggagaatgag ttggtatttt   5700
ttaggaggat atagtattgt tagaatgagt tttttttttg gtttatcgtt gatttatttt   5760
ggtaggtaag gatttattta atgtagttga aaagattagg aggatgatat taatatataa   5820
aaatttataa attataaaaa cgatgtattt ttttgtaatt tttagaaaag ttttataata   5880
ttatttttat ttttattgat tttttattag gttatttttt ttagaagtat ttggagtatt   5940
tagatatttt aataaagtat tttgaggtta gaatgatttt ttagtttcgt ttattttata   6000
gatgaggaaa ttgaggttta ttgaatttaa gtatataaag ttgttgattg ttatatgttt   6060
tcgggaagga gggaattgga gagattatta aaaaagggta atttgatttt tagggaaata   6120
gaagaattgg atattgaatt aatttttttta tattttatat ttatttgaat agaagaaatt   6180
tttgtggttg tagtagtttt gttggttagg aaggggagga tttgacgagt gagttgtttg   6240
tttttttgaat attttttata tagttcgtat atattgttgg ggaaattggg gtttagagaa   6300
gtttggtgat ttaatttaga ttatgtagta aagaaatgat tatagttgga atataggatt   6360
tttgtttttt gttcggggtt ttttgtttgt tattttttat ttttgtggtt ttaaaatgat   6420
aaaaatgtta aataattttt atttgtagat ggtttatgga gatgatataa ataaaggata   6480
attttggaag tgtttattgg tttttttgat agatatagaa atgagtgatg tgtttattcg   6540
tttttattta ttttatattt ttgatttttt ttggatttta tttttgtttt tttttttgtgt   6600
ttgaaatatt tgtagttttg tttttaaaaa attgtagagg atggattgtt tatttgaata   6660
gaaattttat taaaaaatag aatttaggtt tggagtagtt ataattattg atattttagg   6720
ttgtttagag tttggaaatt tttgtttaga tatgtttagt tttttttttt taacgtagtt   6780
gatttcgggg aggataggtt tttttttttt ttgttgtggg gatgggagtt taggtagggg   6840
tgggaggata tagtagtaga ttttttttggt ttgtttcgtt ttggagttag gttaggattg   6900
tggttaaatt ttagaaaggt tacggtatag ttttaggatt ttatttaag ttttattgtt   6960
```

gtttgtattt tcgtttttat atatttaaat tatttaaagg gttggttgtt aaatgtttag 7020
tagaggatag gtattttttt ttattgtttt gaagtttttt tgtttttagg tattttaaat 7080
agattagata ttgtttgttt gtttattttg ggagaaaat ttttttaat aaaggtttgt 7140
aatgaattat ttaaattttt gtggtattga gttttataat gaaataattt tttttgttgt 7200
tgtttttggg aaagaatttt ttttataatt tttagtttat tattattacg atatttaata 7260
tttttaagt atttattaag tgtttagtat tatttagtgt tttaaaaaaa aaagtttgta 7320
attatgtatt tgaatgtgta tttagatata ttttaaggga ggattttg 7369

<210> 36
<211> 2986
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 36

gagggttttt tttagttgtt atattttgga gcgtatgaga tgaggtaggt atataaagtg 60
gataagatgt ggttaagaaa ataagttata tattaagttt atttgtagta taggtgttta 120
agaaaatttt gttgttgtgt aatattagaa cggaaggttg gtttttagta aaatgtatta 180
attttggttt aaattaagat gatgggtatc gggtatgggg gtggggaggt agttgaagat 240
ttattgagtt ttgttttagg gtagttttgt ttatcgtttt attttatttt ttattacggt 300
gtttaagttt atattgagag agaaattttt agttgtaaaa gggagaagag aaacgttgga 360
atattagtat cggacgttag gatatggttg tggtgtttta aaaattattt tattatttgg 420
agtttgattt cgaggggagt atttttattt tttagttttt tgaaagtatt tattagtatt 480
tgaatattgt tttgagtttg ttggagtagt gaaatttggt gagagagaag ggtggaggaa 540
ggaaggagtt gttgtatttg gcggttggat ttaggtagag gaaattgtta taatttcggg 600
aaagaataga aaagtagaaa gggacgagtt tttatacgta gttaatgttt atggttttaa 660
ttgtgtttgg gaaggaagat tttgggttag gggtgtattt tcgtttttta aaattaaacg 720
tgtttgagat agttataaag tttattaagg gatttgagag attagagttt tttgtttttt 780
tttttttaatt ttgagttttt tttttatttt tattgaggga gagtttgagt ttatgataag 840
tgtcgcgttt atttttggtt aatttttaaa agaaagacgt tcgttttggt ttttttttta 900
ggtttttagt tttttttaggg atggtagaaa tttttgggtt aaggttgagc gaattattgt 960
ttattgtttt tattagtttt tagtaaaggt acgtcggcgg gggggcgttt agttttttta 1020
gtaaacgttt cgcggttttt ttcgtagatt acgaggtggg ggtcgttggg gagggtcgag 1080
ttgggggtag ttcgttattt cggtttttag cgagttgtcg gcgattttcg cggtttttttg 1140
gtttaggttt cggtttttcg ggcgaggagc gggagggagg tcggggttta ggcgtcgcgg 1200
cgaattcgtt aacgtagcgt cgggtttcga atttaggtt tcgttttagg ttttcggtcg 1260
tttggttagt ttgtttgttt taattttaat tttttcgagg ttagttagag taggtttgtt 1320
ggtagtagta ttttttttagt agttacgcga ttagttaatt tttcggcggc gttcggggag 1380
gcggcgcgtt cgggaacgag gggaggtggc ggaatcgcgt cggggttatt ttaaggtcgc 1440
gttcgttagt ttcggcgggg cggttttcgt cgtcgtaatt aatggatttt tttttttgtt 1500
taaatagatt cgtcgtgtta attatttttt ttttcgttag tttttttttt atcgttatat 1560
tgggttatta aaaaaagggg gttcgttttt tcggggtgtt tttttttttt tttttttgttt 1620
tcgtttgttt acggttttgc gatttcgacg tcggtaaggt ttggagagcg gttgggttcg 1680
cgggattcgc gggtttgtat tcgtttagat tcggacgggt tttgttattt ttttcgtttg 1740
tttggttttt ttttttttttc gtttttcgt tcgttagttt atttgattag cggagattcg 1800
gcggtcgggt cggggttttt tcgtagtttt tgcgcgtttt tagagttcgg gtcgtggttc 1860
gtcggggttt gtgtttttttg gtttcgaggg tagtcgttgg gttttcgaga ggggttcggg 1920
ttgcgtaggg gcgttttgtt ttgttcggtt ttgtttttttt gagagtgcga gagaggcggt 1980
cgtgtagatt cgggagaaag atgttaaacg tgcgagtgtt taacgggagt tttagtttgg 2040
agcggatgga cgttaggtag gcggagtatt ttaagttttc ggtttgtagg aattttttcg 2100
gttcggtgga ttacgaagag ttaattcggg atttggagaa gtattgtaga gatatggaag 2160
aggcgagtta gcgtaagtgg aatttcgatt tttagaatta taaattttta gagggtaagt 2220
acgagtggta agaggtggag aagggtagtt tgttcgagtt ttattataga ttttcgcggt 2280
tttttaaagg tgtttgtaag gtgtcggcgt aggagagtta ggatgttagc gggagtcgtt 2340
cggcggcgtt tttaattggg gtttcggtta attttgagga tacgtatttg gtggatttaa 2400
agattgattc gtcggatagt tagacggggt tagcggagta atgcgtagga ataaggaagc 2460
gatttgtaat cgacggtaat gattttttttt taattataga atgtgtttgg ggtttcgttt 2520
tgtttgttgg agggtgttaa ttttagtttg tttttcggcg tattttgatt tagttttggg 2580
agagttaatt ttattggttt taggtgttta gtgttatttg gtttattgtt tgtttgtttg 2640
tgatttttaa gttagaaatt ggagatggta agattcgata atttttttaa tttaatatat 2700

cgcggttttt tttattagta atttttaggt atgtgataaa gttgggatgt ttattaacgg 2760
ttcgtttttt ggttagggaa agagttttgg ggcggagaat gtatttttttg tttttgaaa 2820
ataattttat tttgtgtttt taaaagttat tggggatgac ggatttagga ttgtgggtgg 2880
aggtagtggg tttttatttt tttgattatg gggttaattt ttgttagtta ttgttttttt 2940
taataaagat tgtgtgtttt ttttaaaaat tttttttgcg tttaga 2986

<210> 37
<211> 2986
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 37

tttaagcgta ggggaaattt ttaaaaagaa tatataattt ttattagaaa aaataatggt 60
tggtagaagt tggttttata gttaggggat gaaaaattta ttatttttat ttataatttt 120
ggattcgtta tttttagtgg tttttaaggg tataaaatga ggttgttttt aaaaaataga 180
aagtgtattt ttcgttttag agtttttttt ttagttagga ggcggatcgt tgataaatat 240
tttaattttg ttatatattt aggagttgtt agtgagaggg atcgcgatgt attaagttag 300
ggaaattatc ggatttatt atttttagtt tttgatttaa aagttataaa tagataagta 360
gtgggttagg tagtattgaa tatttaagat taataaagtt agttttttta aagttaaatt 420
agaatacgtc gaaaagtaag ttaaggttaa tattttttag taggtaaagc ggggttttaa 480
atatatttta tggttgggaa agggttatta tcgtcggttg taggtcgttt ttttattttt 540
gcgtattgtt tcgttaattt cgtttggttg ttcgacggat tagtttttgg gtttattaaa 600
tgcgtgtttt tagagttagt cggagtttta attaaaggcg tcgtcgggcg gttttcgttg 660
atattttggt tttttgcgt cggtatttttg taggtatttt tggggggtcg cgggggtttg 720
tagtagaatt cgggtaagtt gttttttttt atttttgtt attcgtattt gtttttagg 780
ggtttgtgat tttgaaaatc gaaattttat ttgcgttggt tcgttttttt tatgtttttg 840
tagtgttttt ttaagtttcg ggttaatttt tcgtggttta tcgggtcgaa gaggtttttg 900
taggtcgagg gtttggggtg tttcgtttgt ttggcgttta ttcgttttag gttagggttt 960
tcgttagata ttcgtacgtt tgatattttt ttttcgggtt tgtacgatcg tttttttcgt 1020
atttttaaaa aaataaaatc gaataaaata aagcgttttt acgtagttcg aatttttttc 1080
ggaagtttag cgattgtttt cggagttaaa agatatagat ttcgacgagt tacggttcga 1140
gttttaggag cgcgtagggg ttgcggggaa gtttcggttc ggtcgtcgag ttttcgttga 1200
ttaaatggat tggcgagcgg gagggcggag aggagagggg attaggtaag cggagagggt 1260
ggtaaagttc gttcgagttt gggcgggtgt aagttcgcgg gtttcgcgaa tttagtcgtt 1320
ttttaaattt tgtcggcgtc ggagtcgtag agtcgtgagt aagcggggat aggggagggg 1380
gagaaaaata tttcgaaaag acgagttttt ttttttagt ggtttaatat ggcggtggaa 1440
gggaggttga cgaagaagaa aatgattgat acggcgagtt tatttaaata gaggaggaga 1500
tttattggtt gcggcggcgg gagtcgtttc gtcgaggttg gcgagcgcgg ttttaaggtg 1560
gtttcggcgc ggtttcgtta ttttttttcg ttttcgagcg cgtcgttttt tcgagcgtcg 1620
tcgggagatt ggttggtcgc gtgattgttg gaggggtatt gttgttaata aatttgtttt 1680
ggttggtttc ggagaaatta aaattaagat aaataaatta gttaaacggt cgggaatttg 1740
gggcggggtt tgaggttcgg ggttcggcgt tgcgttggcg ggttcgtcgc ggcgtttaag 1800
tttcgatttt tttttcgttt ttcgttcggg aagtcgggat ttggattaga ggatcgcgaa 1860
ggtcgtcggt agttcgttag gagtcggggt ggcgagttgt ttttagttcg gtttttttta 1920
gcggttttta tttcgtggtt tgcgggggag gtcgcggagc gtttgttggg ggggttgggc 1980
gtttttcgt cggcgtgttt ttgttggggg ttggtggagg tagtgggtaa tggttcgttt 2040
agttttaatt tagaagtttt tgttattttt ggggaggttg ggggtttagg gaagaagtta 2100
aagcgaacgt ttttttttta gaaattagtt aggagtagac gcggtattta ttatgaattt 2160
aagttttttt ttaatgaaaa taagaaagga atttaagatt aaaaaaaaaa aataaaaaat 2220
tttagttttt taagtttttt aataaatttt gtagttgttt tagatacgtt tagttttgaa 2280
aaacgagggt atatttttgg tttaggattt ttttttttaa gtatagttaa ggttatggat 2340
attggttgcg tgtgggaatt cgtttttttt tatttttttg tttttttttcg ggattgtagt 2400
agtttttttt atttgagttt agtcgttaaa tataatagtt tttttttttt tttattttt 2460
tttttatta gattttattg ttttaataaa tttagaataa tatttagatg ttagtgaatg 2520
tttttagagg gttgaagggt gaaaatattt ttttcggggt taaattttag atgatgaaat 2580
gatttttaaa atattataat tatgttttaa cgttcgatat tagtatttta gcgttttttt 2640
tttttttttt gtagttggaa attttttttt tagtgtgggt ttgagtatcg tggtggaagg 2700
taaagtagga cgatgagtag ggttgttttg agataaagtt tagtggattt ttaattgttt 2760
ttttattttt atgttcggta tttattattt tggtttgagt taaagttaat gtattttatt 2820

ggaaattaat ttttcgtttt aatattatat agtagtaaag tttttttaag tatttatgtt 2880
atagatgagt ttgatgtgta gtttgttttt ttagttatat tttgtttatt ttgtgtgttt 2940
attttatttt atacgtttta gaatgtgata gttggaaggg attttt 2986

<210> 38
<211> 5666
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 38

aaaattagaa tttttatttt tttgcgtttg ttatattttt tagtgttgtt taattttttt 60
ttgtaagtga gggtggtgga gggtgtttat aatttttttta gggagtaagt ttttttttggt 120
tttttttttt tttttttttt tttttttttt tgagattaag tttcgttttt gtttttttagg 180
ttggagtgta atggcgcgat ttcggtttat tgtaattttc gttttttttt gggtttaagc 240
gatttttta tattagtttt cgagtagttg ggattatagg tatgcgttat taagtttcgt 300
taattttgta tttttagta gagatagggt ttcgttatgt tggttaggtt tgtttcgaat 360
ttttggtttt aggtgattcg tttgtttcgg tttttttagaa tgttgggatt atagacgtga 420
gttatcgtat tcggattttt tttttatgta atagtgataa ttttatttaa agtattttttt 480
tttttttttg agtcggagtt ttattttgtt atttaggttg gagggtggtg gcgcgatttc 540
ggtttattgt aatttttgtt tttcgggttt aagcgatttt tttgttttag tttttttgagt 600
agttggaatt atatacgtgc gttattatgg ttagttaatt tttgtatttt tagtagagac 660
ggggtgttat tattttggtt aagttggttt cgaatttttg attttaggtg atttgttcgt 720
ttcggttttt taaagtgttg ggattatagg tgtgagttat cgcgttttgt tttaaagtat 780
ttttttttta tgttttaaaa taagattgta agttagtttt taaagcggat aatttaagag 840
ttaataggta ttagtttagg atgtgtggta ttgtttttaa ggtttatatg tattaatata 900
ttatttaaat ttataataat ttttataaag taggggggtat ttatattttt tttttttttt 960
ataattacga aaaatgtaag gtatttttag taggaaagag aaatgtgaga agtgtgaagg 1020
agataggata gtatttgaag ttggtttttg gattattgtg taattttgtt tttagaatat 1080
tgagtatttt ttttggttta ggaattatga ttttgagaat ggagttcgtt tttttaatga 1140
tttttttttt atttttttat ttgtttatag gtagaatttt ttttcgttcg tattaaataa 1200
attttatttt tttagagttt gtttttatat taggtaatgt atacgtttga gaaatttttg 1260
ttttagatag tcgttttata cgtaggaggg gaaggggagg ggaaggagag agtagttcga 1320
tttttttaaaa ggaatttttt gaattagggt ttttgattta gtgaatttcg cgtttttgaa 1380
aattaagggt tgagggggta gggggatatt ttttagtcgt ataggtgatt tcgattttcg 1440
gtggggtttt tataattagg aaagaatagt tttgtttttt tttatgatta aaagaagaag 1500
ttatattttt tttatgatat taaatatttc gatttaattt ggtagttagg aaggttgtat 1560
cgcggaggaa ggaaacgggg cgggggcgga tttttttttta atagagtgaa cgtatttaaa 1620
tacgttttttg ttggtaggcg gggagcgcg gttgggagta gggaggtcgg agggcggtgt 1680
gggggtagg tggggaggag tttagttttt ttttttttgtt aacgttggtt ttggcgaggg 1740
ttgttttcgg ttggtgtttt cgggggagat ttaatttggg gcgattttag ggtgttata 1800
ttcgttaagt gttcggagtt aatagtattt ttttcgagta ttcgtttacg gcgtttttttt 1860
gtttggaaag atatcgcggt tttttttagag gatttgaggg atagggtcgg aggggggtttt 1920
ttcgttagta tcggaggaag aaagaggagg ggttggttgg ttattagagg gtggggcgga 1980
tcgcgtgcgt tcggcggttg cggagagggg gagagtaggt agcgggcggc ggggagtagt 2040
atggagtcgg cggcggggag tagtatggag ttttcggttg attggttggt tacggtcgcg 2100
gttcggggtc gggtagagga ggtgcgggcg ttgttggagg cgggggcgtt gtttaacgta 2160
tcgaatagtt acggtcggag gtcgatttag gtgggtagag ggtttgtagc gggagtaggg 2220
gatggcgggc gattttggag gacgaagttt gtaggggaat tggaattagg tagcgtttcg 2280
atttttcgga aaaaggggag gtttttttggg gagtttttag aaggggtttg taattataga 2340
tttttttttg gcgacgtttt gggggtttgg gaagttaagg aagaggaatg aggagttacg 2400
cgcgtataga tttttcgaat gttgagaaga tttgaagggg ggaatatatt tgtattagat 2460
ggaagtatgt tttttattag atataaaatt tacgaacgtt tgggataaaa agggagtttt 2520
aaagaaatgt aagatgtgtt gggattattt agtttttaat ttatagatat ttggatggag 2580
tttatttttt ttattaggag ggattattag tggaaatttg tggtgtatgt tggaataaat 2640
atcgaatata aattttgatc gaaattattt agaagcggtc gggcgcggtg ttttacgttt 2700
tgtaattttt ttattttggg agattaaggc ggggggaatt atttgaggtc gggagttcga 2760
gattagtttg gttaataggt gaaatttcgt ttttattaaa aatataaaaa gtagtcgggg 2820
gtggtggtag gcgtttgtaa ttttagttat tcgggaggtt gaggtaggag aatcgtttga 2880
attcgggagg ttgaggttgt agtgaatagc gagatggagt tattttattt tagtttgggt 2940

gatagagtga gattttgtcg aaagaaagaa agagagaaag agagagagaa aaattattta 3000
gaagtaatta tatattgtgt ttattttaa ttgagtaggg taaataaata tatgtttgtt 3060
gtaggaattt aggaaataat gagttatatt tatgtgatta ttttagaggt aatatgtagt 3120
tattattttg ggaatatttg ttaatatttt tgtttttta ttatttttag tttatttgat 3180
atagtttatt tgtgataaga gtttttaatt ttttattttt gaatagaggt gttttttttt 3240
tttttatttt tgttttgtga gggagttagg ggaggattta aaagtaatta atatatgggt 3300
aatttagtat ttttaaaatt ttgttaatag tttgaattcg ggagtttggt tttgtagttt 3360
tataatattt tagaagagat tttatttgtt taaaaataaa aaggaaaaag aaaagtggat 3420
agttttgata atttttaatg gagaagggag aagaatatgt agaaaagggg aaatgatgtt 3480
ggtttagaat tttaattata ttggtgttta atataggaat atttatttat ataatatttt 3540
aaagtattaa atttatatta gtatattatt aaatggatat attattaaat gggtttaagt 3600
attttatata ttttaattta attgatttat tttttttttg ttttggattt ttattatgat 3660
ttaaatattt atatatgggt tattttttag atttttttata ttatgaaata taagaaaaat 3720
ttttaaggtt agttttatga ttaagacgaa ggattttatt gaatatataa aataataaat 3780
atattgtaat attttgtttt ttttttgta gttgtaattt ggtttgttta tatttttttt 3840
ttgtttttt gaaaattgag ttagttttat tttttagga taggatttaa taattataat 3900
ataatttagt ataatttttt gatttaggta aattatgtaa tttgtgttta gtatgaaatg 3960
tatttaaaaa taagtaattt ttttttaata ttattatttt taaattaata taataaataa 4020
tagttatttt aaaataaatt gtttattttt attatgtagt atttaaattt taaggttgtt 4080
atgattgtag atagtatttt aaaatttttt tttggaaatg gttttgtttt taagatgatt 4140
taggaattaa agaggtgatt attttttgtt taatgaattt ttaaattata aatttgggaa 4200
gtgttttagt tttttattgt tgttgttata aattattata aatgtgttag ttaaaataaa 4260
tataaaatta ttattttata gttttagaga ttagaagtta aaaatgggtt tataaggttt 4320
tattttttttt ggaaatttta aggggtaatt tgtttttttg tttttttttag tttttagtga 4380
ttattaaatt ttttggttta tggtttttgt atttttttttg tggtttgtgt ttttattttt 4440
gtattttttt tttgattgtg atttttttaat aaaaatattt ggggttatgt tgggtttatt 4500
ttgaaaattt tggataattt tttttaagat tattaattaa attatatttg taaagttttt 4560
tttgttatat aagttaatgt attaaaagtt tttgaggatt aggatataga tattgggggt 4620
gggggggtat tatttagttt attataggaa ggaattttag ggttaattaa attagttttt 4680
ttattttata tttgaagaaa ttgaagtttt ggaattggag agtattatgt taaatgaaat 4740
aagttaaata tagaaagata aatattatat gtttttattt atttgtgaaa tataaaataa 4800
ttatattttt agtagtaaag agtagaatgg tggttattag agttgggggg tgggaggaat 4860
ggggagatgg taattaagat ataaagtttt agttaagatg ggaggaataa gtttgattgt 4920
ttttttgag atgtgtttta tagtatgatg aatatagtta aatagtaaat tttaaatgtt 4980
tttatttgat aaaaatgtta aatatttgag atgatggata ggttatttag tttgatttaa 5040
taattttta ttgtgtttaa agattataat tttatattgt attatataaa tatatataat 5100
tgtattattt taatatataa ttttaaaatt aatataatga aaaagaaatt gaagtttaat 5160
atttttagaa gttaagtgta atttaaaagt tttgtgagaa tttgttttaa taaataaata 5220
agtttttttt ttttaataat tattatattt tgcgtttgga tatatagtag tgaataaaaa 5280
aaaaaaaaaa aaaaaaaatt tttaggttta atataatttt aggaagaaat tttagtagtt 5340
gtattttagg ggaaatatag gaagttagtt tggagtaaaa gttagtttgt ttttgttttt 5400
ttgttatttt gttcgtgttt tatagtgttt tttgtttgtg acgatagttt cgtagaagtt 5460
cggaggatat aatggaattt attgtgtatt gaagaatgga tagagaattt aagaaggaaa 5520
ttggaaattg gaagtaaatg taggggtaat tagatatttg gggtttgtgt gggggtttgt 5580
ttggcggtga gggggtttta tataagtttt tttttcgtta tgtcggtttt tattttggtt 5640
ttgattattt tgttttttttt ggtagg 5666

<210> 39
<211> 5666
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 39

tttgttagag agaatagaat ggttagagtt agggtggggg tcggtatgac ggaaaggaag 60
tttgtgtaga gtttttttat cgttaagtag atttttatat aagttttagg tgtttaatta 120
tttttatatt tgtttttagt ttttaatttt tttttgagt tttttattta tttttagta 180
tataatgaat tttattatat ttttcgaatt tttgcggagt tgtcgttata ggtagagagt 240
attgtgaggt acgggtaaaa tagtaaaggg gtagggatag attgattttt attttaggtt 300
aatttttgt atttttttttg agatataatt attgaaattt tttttgaaa ttatgttagg 360

```
tttggagatt ttttttttt ttttttttt tgtttattgt tgtatattta agcgtagaat      420
gtggtaattg ttaaaagag aaaatttgtt tgtttgttaa aataaatttt tataaaattt      480
ttaagttata tttagttttt gggaatgttg aattttaatt ttttttttat tatattagtt      540
ttaaaattat atattgggat agtatagttg tatatattta tgtggtataa tatgaagtta      600
tgatttttga atataatggg gaattattaa gttaagttaa gtaatttatt tattatttta      660
aatatttgat attttgtta aatgagagta tttgggattt attatttagt tatatttatt      720
atgttatgaa atatatttta aaaaaaataa ttaaatttat tttttttatt ttaattgagg      780
ttttatattt tgattattat ttttttattt tttttatttt ttagttttag taattattat      840
tttattttt attgttaaga atgtaattgt tttatatttt atagataagt gagaatatgt      900
gatatttgtt tttttgtgtt tggtttattt tatttagtat aatgtttttt aattttaaaa      960
ttttaatttt tttaagtata aaataagaag gttagtttaa ttaattttaa aatttttttt     1020
tgtggtaggt tgaataatgt tttttattt ttaatgttta tgttttaatt tttaaaaatt     1080
tttaatatat taatttatgt ggtaaaagag gttttgtaga tgtgatttaa ttaatggttt     1140
tgagggagat tatttagaat ttttagggtg ggtttaatat aattttaagt gtttttatta     1200
gagggttata gttagagaga agatataaga atggaagtat aggttataga gaaaatatag     1260
agattatgag ttaaggaatt tgatggttat tagaagttgg aaaagataag gaaatagatt     1320
gtttttttaga gtttttaaaa ggaatgaaat tttgtggatt tatttttgat ttttgatttt     1380
tagaattgta aaataataat tttgtgtttg ttttagttaa tatatttgtg ataatttgta     1440
atagtagtag taggaaatta aaatattttt taggtttatg atttgagagt ttattaaata     1500
agagatggtt attttttttgg tttttaaatt attttggaaa taaagttatt tttagagagg     1560
aattttaaaa tattgtttgt agttatagta attttaaaat ttgagtgttg tatggtggaa     1620
gtagataatt tattttagga taattgttat ttgttatatt agtttgagga tggtggtgtt     1680
aaagaggagt tatttatttt taggtatatt ttatattaaa tataaattgt ataatttgtt     1740
taaattaagg aattatatta aattatatta tggttattaa atttgtttt gagaaagtga     1800
aattgattta gtttttaaag agataaagag aaagtataag taaattaaat tgtagttata     1860
aaaagaaaga taaaatgttg tagtatattt attgttttgt gtatttaatg aagtttttcg     1920
ttttggttat aaaattagtt ttaaaggttt tttttatatt ttatagtatg aaaaatttaa     1980
aaagtaattt atatgtaaat atttaaatta tgatagaaat ttaaagtaaa aagaaaatga     2040
attaattgaa ttaaaatgtg taggatgttt aaatttattt gataatatat ttatttgata     2100
atatattaat atgaatttag tattttaaaa tgttatataa ataaatgttt ttatattaaa     2160
tattaatgta gttaggattt taagttaata ttattttttt tttttatat gttttttttt     2220
ttttttatt aaaaattgtt aaaattattt attttttttt ttttttttg tttttaaata     2280
aataaggttt tttttaagat attgtaggat tataaagtta aattttcggg tttaagttgt     2340
tggtaaaatt ttagagatgt taagttattt atgtattaat tatttttaaa ttttttttta     2400
attttttat aaaataggag tagggagagg agaaatattt ttgtttaaaa atgaggaatt     2460
gaaaattttt attataaata aattatatta agtaagttaa agatagtaaa agagtaaaaa     2520
tgttagtaga tatttttaaa atggtaatta tatattattt ttggaatgat tatatgaatg     2580
tggtttatta tttttaagt ttttatagta aatatatatt tatttgtttt atttagttaa     2640
aaataaatat aatatgtagt tgtttttgaa taattttttt ttttttttt ttttttttt     2700
ttttttcgat aaagttttat tttgttattt aggttggagt gaagtggttt tatttcgttg     2760
tttattataa ttttagtttt tcgggtttaa gcgatttttt tgttttaatt tttcgagtag     2820
ttgggattat aggcgtttgt tattattttc ggttattttt tgtattttta gtagaggcga     2880
ggttttattt gttggttagg ttggtttcga attttcgatt ttaggtgatt tttttcgttt     2940
tgattttttta aagtgaaggg attataaggc gtgaggtatc gcgttcggtc gtttttgaat     3000
aatttcgatt aaaatttata ttcgatattt attttaatat atattataga tttttattga     3060
taattttttt tagtaagaaa gataagtttt atttaggtat ttgtgaattg gaggttaagt     3120
agttttagta tattttatat tttttaaga tttttttttt attttaaacg ttcgtaaatt     3180
ttgtatttga taaagagtat atttttattt aatataaata tgtttttttt tttagatttt     3240
tttagtattc gagagatttg tacgcgcgtg gtttttatt ttttttttt ggttttttaa     3300
gtttttaggg cgtcgttagg aggaggtttg tgattataaa ttttttttga aaattttta     3360
ggaagttttt tttttttcg gagaatcgaa gcgttatttg attttaattt ttttgtaaat     3420
ttcgtttttt agagtcgttc gttattttt gttttcgttg tagatttttt atttatttgg     3480
atcggttttc gatcgtaatt attcggtgcg ttgggtagcg ttttcgtttt tagtagcgtt     3540
cgtatttttt ttattcgatt tcgggtcgcg gtcgtggtta gttagttagt cgaaggtttt     3600
atgttgtttt tcgtcgtcgg ttttatgttg tttttcgtcg ttcgttgttt gttttttttt     3660
ttttcgtagt cgtcgagcgt acgcggttcg ttttattttt tggtgattag ttagtttttt     3720
ttttttttt tttcggtgtt ggcggaagag tttttttcga ttttgttttt taaatttttt     3780
ggagggatcg cggtattttt ttaggtaagg ggacgtcgtg agcgagtgtt cggaggaggt     3840
gttattaatt tcgagtattt agcgaatgtg gtatttttga agtcgtttta ggttgggttt     3900
ttttcggggg tattagtcgg aagtagtttt cgttagagtt agcgttggta aggaaggagg     3960
attgggtttt tttttatttg tttttatat cgtttttcgg ttttttgtt tttagtcgcg     4020
tttttcgtt tgttagtaaa ggcgtgtttg agtgcgttta ttttgttaaa aagaaattcg     4080
ttttcgtttc gttttttttt ttcgcgatat aattttttta attgttaaat tgaatcgggg     4140
```

tgtttggtgt tatagggaaa gtatggtttt ttttttaat tataagaaaa agtaaaatta 4200
ttttttttta gttgtgagag ttttatcgag aatcgaaatt atttgtacga ttagaaagtg 4260
ttttttatt tttttaattt ttgattttta ggagcgcggg gtttattaag ttagaaattt 4320
tagtttaaag gatttttttt ggagagtcgg attgtttttt ttttttttt ttttttttt 4380
tttgcgtgta aaacggttgt ttggggtaag ggttttttag acgtgtatat tgtttggtat 4440
aagagtagat tttgaaaaga tgaggtttat ttaatacgga cgggggagaa ttttgtttgt 4500
aggtagatag gaaaatgggg agggagttat tggaaggacg gattttattt ttaaagttat 4560
aatttttaga ttagaaaaag tgtttagtgt tttagaagta gagttgtata gtgatttaaa 4620
gattagtttt aaatattgtt ttgtttttt tatatttttt atattttttt tttttattga 4680
aaatattttg tatttttcgt aattataaag ggggaaggga atatgagtgt tttttgtttt 4740
ataggggttg ttgtgagttt aaatgatgta ttaatatata taagttttaa gaatagtgtt 4800
atatatttta agttaatatt tgttagtttt tgaattattc gttttgagga ttggtttgta 4860
attttgtttt gaggtataga aagaaaatgt tttggagtag gacgcggtgg tttatatttg 4920
taattttagt attttgggaa gtcgaggcgg gtagattatt tgaggttagg agttcgaggt 4980
tagtttggtt aaaatggtga tatttcgttt ttattaaaaa tataaaaatt agttggttat 5040
ggtggcgtac gtgtgtaatt ttagttattt aggaggttga ggtaggagaa tcgtttgaat 5100
tcgggaggta gaggttgtag taagtcgaga tcgcgttatt attttttagt ttgggtgata 5160
gaatgagatt tcgatttaaa aaaaaaaaaa aatgttttgg atagaattat tattattata 5220
taaaaggaaa gttcggatgc ggtggtttac gtttataatt ttagtatttt gggaggtcga 5280
gataggcgga ttatttgagg ttaggagttc gagataagtt tgattaatat ggcgaaattt 5340
tgtttttatt aaaaaatata aaattagcgg ggtttggtgg cgtatgtttg taattttagt 5400
tattcggagg ttgatgtagg agaatcgttt gaatttagga gaaggcggag gttgtagtga 5460
gtcgagatcg cgttattgta ttttagtttg ggagataaga gcgaaatttg gttttaagaa 5520
aaaaagaaag aaagaaagaa agaaagatta agaagaattt atttttgaa aagattatgg 5580
gtatttttta ttatttttat ttataaagaa aagttaaata gtattaaaga gtataataag 5640
cgtaaggagg taaaagtttt aatttt 5666

<210> 40
<211> 5085
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 40

tgatggttgt ataattttga gtatatgaaa aattaatgaa ttgatatttt gagtgagttg 60
tatgatattg gaattatatt ttaataaagt atggtaattg ttttaagata ggttggaaag 120
agaaagtttg aaaataataa taatgatatt aataaattag tttatttttt tagttttata 180
tatttttgtg tttatatttg tttttgtttt atttataatg gttttttgt agttgttata 240
ttatatttttg ttatttgatg ttcggtgaat attttatatt tgttttttag aatttttttt 300
atttttttt tatttgttta attttatat atttaaaatt aattagagta aattatttat 360
tagaataatt aattttaaat tttagtaatt taatatgata aaggtttgtt ttttatttat 420
atagtttttt tttagatgat cgaggggttt aggtttttta tttttagtgg tttttttatt 480
ttttggagtt ttttgtattt tttatatatg gttgagataa attatgagtt attagtatag 540
ttagattttg aggttttata agaaaatttg taaattattt attttgtttt gaataaggta 600
tatttaagat gatgttaaaa tatttaatgg ttttgggtta aatatagttt atgattgtgt 660
atttaaaata tatattgtaa tatttttttt ttttttttatt gattttatga atttagcggg 720
gatttatttt ataagtttaa agataattat tttttagatt aagaatattt agggtaaaaa 780
gtattgttta atatttttat tgaggatgtt atgatgtagt atattgtata agttggagtt 840
aaaggaaatt tttttttaaag tgttatttat taaaaattgg aatatatttt ttaagataaa 900
tcgaagtgtg gtatataata tttaaatttt tattatagat atagaggtgt tattattttt 960
tatttttaaa tttttttgtt acgttgagga tatttaagag gagtaggata tgttggtcgt 1020
agtaggagaa atttgaaagt atttattttt atggaattta taagggagag aattttttat 1080
tttagtatcg tttttgatat atttattatt ttaaaagata atgtagttaa atgttttttt 1140
ttgtgttaaa tttttataaa attgaaattt taaaatggtg ataaaaattt tatttttgat 1200
agaatttatt tatttttttta attagatagg gtataatttt taatttgtaa aataaaacgt 1260
aatatgttta tgaggtttta ttttaaagaa tttgttattg agagtagtat ttagaataac 1320
gggtggaaat gttaatttta gagttttaga ttttatcggt aattggggta gggaggggtt 1380
ttgggcgggg ttttttttaga ggaggaggcg ttgttagaaa gttgtttggt tagtttatag 1440
ttgttattaa tcggggtaag ttttgttgta tttgtgcgtg tgggtggtat ttttaatgag 1500
aattagtttt atttgttatt tgagtgaaat ttataattcg aggcggttag tgttttcgta 1560

ttattgggat ttgagatttt cggagatgat tgtcgttcgt agtacggagt tagtagaagt 1620
tcgatttttt ttgggaatgg gttgtatcga gaggttcgat tagttttagg gttttagtga 1680
gggggtagtg gaatttagcg agggattgag agttttatag tatgtacgag tttgatgtta 1740
gagaaaaagt cgggagataa aggagtcgcg tgttattaaa ttgtcgtcgt agtcgtagtt 1800
atttaagtgt cggatttgtg agtattttgc gtttttagtt ttcggataga agttggagaa 1860
tttttttgga gaatttttcg agttaggaga cgagattttt taataattat tatttttttt 1920
tgcgtttttt atttgtcgtt cgttgggata aacgatagtt atagtttttt tgacgatagg 1980
atggaggtta agggtaggag ttgattagcg tcgttttttt tcgttttcga tttaggaggt 2040
ggagattttt tcggtttagt tatatttaat atttattttt tttttttttt gtttttatat 2100
tttcgaaatt tttttttttt tttttttttt ttttttttttg gagacggggg aggagaaaag 2160
gggagtttag tcgttatgat tgagttgaag gtaaagggtt ttcgggtttt ttacgtggcg 2220
ggcggttcgt ttttttttcga ggtcggattt ttattgttgt gtcgtttagt cgtaggttcg 2280
ttttcgggga gttagatttc ggatattttg tttgaagttt cggttatatt tatttttttg 2340
gacgggttat tttttttttcg gttttgttag ggataggatt ttttcgacga aaagacgtag 2400
gattagtagt cgttgtcgga cgtggagggc gtatatttta gagttgaagt tataaggggt 2460
gttggaggta gtagttttag tttttttagaa aaggatagcg gattgttgga tagtgttttg 2520
gatattttgt tggcgttttt aggtttcggg tagagttaat ttagtttttt cgtttgcgag 2580
gttattagtt tttggtgttt gtttggtttc gaatttttcg aagatttatc ggttgttttc 2640
gttatttagc gggtgttgtt ttcgtttatg agtcggttcg ggtgtaaggt tggagatagt 2700
ttcgggacgg tagttgttta taaagtgttg tttcggggtt tgttattagt tcggtagttg 2760
ttgttttcgg tttttgagag tttttattgg ttcggggttt tagtgaagtc gttttcgtag 2820
gtcgttgcgg tggaggttga ggaggaggat ggttttgagt tcgaggagtt tgcgggttcg 2880
tttttgaagg gtaaatttcg ggttttgggt ggcgcggcgg ttggaggagg agtcgcggtt 2940
gtttcgtcgg ggcggtagta ggaggcgtcg ttttggtttt taaggaagat tttcgttttt 3000
tagcgtttag ggtcgttttg gtggagtagg acgcgtcgat cgttcgggac gttttcgttg 3060
gttattacgg tgatggattt tatttacgtg tttattttgt tttttaatta cgttttattg 3120
gtagttcgta ttcggtagtt gttggaagac gaaagttacg acggcggggt cggggttgtt 3180
agcgtttttg tttcgtcgcg gagtttattt tgtgtttcgt ttatttcggt cgttgtaggc 3240
gatttttcg attgcgcgta ttcgttcgac gtcgagttta aggacgacgc gtattttttt 3300
tatagcgatt tttagtcgtt cgttttaaag ataaaggagg aggaggaagg cgcggaggtt 3360
ttcgcgcgtt tttcgcgttt ttattttgtg gtcggtgtta atttcgtagt tttttcggat 3420
ttttcgttgg ggttatcgtt ttcgttgtcg tcgcgagcga ttttatttag attcggggaa 3480
gcggcggtga cggtcgtatt cgttagtgtt ttagtttcgt ttgcgttttt ttcggggtcg 3540
attttggagt gtattttgta taaagcggag ggcgcgtcgt tttagtaggg ttcgttcgcg 3600
tcgtcgtttt gtaaggcgtc gggcgcgagc ggttgtttgt tttcgcggga cggtttgttt 3660
tttattttcg tttttgtcgt cgtcgtcggg gcggtttcg cgttttattt tgtattcggt 3720
tttaacgggt tttcgtagtt cggttattag gtcgtcgtgt ttaaggaggg tttgtcgtag 3780
gtttattcgt tttattttaa ttatttgagg tgagggttcg ggacggggta cgtttagcgc 3840
gttcgggagt agcggtttcg ttggcggcgg cggtcgttaa tttttagttt tagttttagc 3900
gtatcgttgc gtttttcggg gcggtcggag agggtgggta gcgggatata gtataggggt 3960
agttgttttt tttttttttt tttttttttt ttatttttgg ggatacgaag gtgggcgtag 4020
aatatattat ttttgggggcg tgtttttttg aaagttgttt ttttgtttgt tttttaattt 4080
ttcgaatttt ttagatttcg aagtagaatt aatttcgatt taaaacgtgt agcgttatat 4140
taggttcgtt gtagtttagt ggggtagaaa gtgcgcggcg agttgggggt tttatgaaat 4200
gtttttttttt tagaagaagg acgtttatta ggagtgtttg ttttggagag gagttaaggt 4260
atcgtttttt cgggaggggt gggatttgag aggtggtcgg ttagaatcga aagtagtatt 4320
attttaggga tttgaatatt ttagtggttt agttttttta agaattttaa gattaaaatt 4380
aagtttacgt gggaaatgtt taaattgtgg atttaaacgt ttgttattgt attgtatcgt 4440
tttttttatta ttgtttgtta tttattataa tttttttttat atataggttt aaaaaatatt 4500
attttgtata ttgaagtaat ggaatgtaaa aaaagaatgt tttgtttgga attttatgtt 4560
gtgaataggt aaaatagtgt tagtgtattg gataatattt taaaatgata aatatatatt 4620
tgtttaagta agtaatgatt atagggttgt gttttaaaaa tttaaaatta aaatattgta 4680
aagtattatc gaatttttaa agttaaatta tatttgtttt gatttagtat atagatagga 4740
aggatataat attttatttg ttaaagatta aattgttttt atataaagag ttttgtagaa 4800
agattttttt ttaatcgatt ttaatttttt aggatataat attatatatt aattattgtt 4860
tttttatatt ggtgttattg atgaatggtt aattatttgt aagtatggtg aatttagtta 4920
cggatagttt attattaagt ttagtttgta tgtttttttaa gtgtatatat atagttttgt 4980
ttttaaaatt ttttttttatt ttgttaatat tggtttaaga aatttttagt attagatagt 5040
ggtgtattta aaaataaatg gagtattttg ttttgtattt taagg 5085

<210> 41
<211> 5085
<212> DNA

<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 41

```
ttttgaaatg taaaataaag tattttattt atttttaagt gtattattat ttaatattaa      60
aggtttttta aattagtatt aatagggtga aaggagattt taaaaataga attgtatata     120
tatatttgaa agatatgtaa attaaatttg gtaatagatt attcgtaatt ggatttatta     180
tatttgtaaa tgattagtta tttattagta gtattaatat aaaagaataa taattagtgt     240
ataatattat gttttagaaa gttaaagtcg gttaaaagga aatttttttta taaaattttt     300
tatatagaaa taatttagtt tttgataaat gaaatgttat gttttttttg tttgtatgtt     360
gggttaaaat aaatatggtt tggttttaaa agttcgatgg tattttgtaa tgttttggtt     420
ttgagttttt aaaatataat tttgtaatta ttgtttattt aagtaagtat atgtttgtta     480
ttttaaagta ttgtttaata tattgatatt gttttgttta tttataatat aagattttaa     540
atagagtatt ttttttttat atttattat tttagtatgt aaagtagtgt tttttaaatt     600
tgtatataaa aaaaattgta gtgaatagta agtaataata agaaaacggt gtaatgtagt     660
gataggcgtt taaatttata gtttaaatat tttttacgtg aatttaattt taattttgag     720
atttttaaga aaattgagtt attgaagtgt ttaaattttt aagatggtgt tgttttcggt     780
tttggtcggt tattttttaa gttttatttt tttcgggga acggtgtttt aatttttttt     840
taagataagt atttttggta aacgtttttt ttttaagaaa gaagtatttt ataaagtttt     900
taattcgtcg cgtatttttt gttttattgg gttatagcgg atttagtgtg acgttgtacg     960
ttttaaatcg ggttggtttt tgtttcggaa tttggaagat tcggaaagtt aaaaaataaa    1020
taaaaaaata gtttttaggg aggtacgttt taaaaatagt atattttgcg tttattttcg    1080
tgtttttaag agtgaggaga ggagggaaga agaagggagg taattgtttt tgtgttgtgt    1140
ttcgttgttt attttttcg gtcgtttcgg ggagcgtagc ggtgcgttgg ggttggggtt    1200
gagggttggc ggtcgtcgtc gttaacggaa tcgttatttt cggacgcgtt gggcgtgttt    1260
cgtttcgggt ttttatttta ggtagttgag atagggcggg tagatttgcg gtaggttttt    1320
tttgagtacg gcggtttggt agtcgagttg cgggagttcg ttgaggtcga gtgtagggta    1380
gagcgcgggg gtcgtttcgg cggcggcggt agaggcggag gtggagggta ggtcgtttcg    1440
cgggagtagg tagtcgttcg cgttcggcgt tttgtagggc ggcggcgcga acgggttttg    1500
ttggggcggc gcgtttttcg ttttgtatag gatgtatttt agggtcgatt tcgaggagga    1560
cgtagacgag attgaggtat tggcgggtgc ggtcgttatc gtcgtttttt cgggtttgga    1620
tggggtcgtt cgcggcggta gcgggggcgg tggttttaac gggaaattcg ggaaggttgc    1680
ggggttggta tcggttataa ggtaggaacg cggggagcgc gcggaggttt tcgcgttttt    1740
tttttttttt tttattttta gagcgggcgg ttggaagtcg ttatagagag ggtacgcgtc    1800
gtttttgggt tcggcgtcgg gcgggtacgc gtagtcgggg aagtcgttta tagcgatcgg    1860
ggtggacgag gtatagggtg aatttcgcgg cggggtaaag gcgttggtag tttcggtttc    1920
gtcgtcgtaa ttttcgtttt ttagtagttg tcgagtgcgg gttgttaata aggcgtgatt    1980
gagaggtagg ataggtacgt ggatgaaatt tattatcgtg gtggttagcg gggacgtttc    2040
ggacgatcgg cgcgttttgt tttattaggg cgattttggg cgttgagaag cgggaatttt    2100
ttttggggat tagggcgacg tttttttgttg tcgtttcggc gggatagtcg cggttttttt    2160
tttagtcgtc gcgttattta gagttcgagg tttgtttttt agaagcggat tcgtagattt    2220
ttcggattta gagttatttt tttttttaat ttttatcgta gcggtttgcg gagacggttt    2280
tattggggtt tcggattagt gagggttttt agaggtcggg agtagtagtt gtcgggttgg    2340
tgataggttt cggggtagta ttttatgggt agttgtcgtt tcggagttgt ttttaatttt    2400
gtattcggat cggtttatga gcggggataa tattcgttgg gtggcggggg tagtcggtgg    2460
attttcggga agttcggggt taaataggta ttaagagttg gtgatttcgt aggcgggagg    2520
gttgggttgg ttttgttcgg gatttgaggg cgttaataga gtgtttaaga tattgtttag    2580
tagttcgttg tttttttttg ggggattaga attgttgttt ttagtatttt ttgtagtttt    2640
agttttggaa tatgcgtttt ttacgttcga tagcgattgt tggttttgcg tttttttcgtc   2700
ggaggggttt tgtttttggt agggtcgagg gaagagtagt tcgtttaggg agataggtat    2760
ggtcgaaatt ttaggtaagg tgttcgaggt ttggtttttc gggaacggat ttgcggttgg    2820
gcgatatagt agtggggatt cgatttcggg ggagggcggg tcgttcgtta cgtggggagt    2880
tcggggattt tttgttttta gtttagttat gacgattgga tttttttttt ttttttttttc   2940
gtttttaggg aggagggaaa agggaaggag gaggggggttt cgggaatata ggggtagagg   3000
gaggagaaag tgggtgttga atgtggttgg atcggaggga tttttatttt ttgggtcggg    3060
ggcgggggag ggcggcgttg gttagttttt gtttttggtt tttattttgt cgttagggga    3120
attgtggttg tcgtttgttt tagcgagcgg taagtgggga gcgtaagaaa aagtagtaat    3180
tgttaggaga tttcgttttt taattcgggg agttttttaa gagagttttt taatttttgt    3240
tcgaggattg gagacgtaga gtatttataa gttcggtatt tgagtggttg cggttgcgac    3300
ggtaatttag tgatacgcgg ttttttttatt tttcgatttt ttttttggta ttaaattcgt   3360
```

```
gtatgttgtg aagtttttag tttttcgttg agttttattg tttttttatt aaaattttgg     3420
ggttagtcgg atttttcggt atagtttatt tttaggaagg gtcggatttt tgttggtttc     3480
gtattgcggg cgatagttat tttcgaagat tttagatttt agtagtgcgg gagtattagt     3540
cgtttcgggt tgtagatttt atttaaatga taagtgaagt tagtttttat tgagaatgtt     3600
atttatacgt ataaatataa taaggtttat ttcgattagt gatagttgtg gattggttag     3660
atagtttttt aataacgttt tttttttag ggaggtttcg tttaaagttt tttttttattt     3720
taattatcgg taggatttga aattttggag ttggtatttt tattcgttat tttgaatgtt     3780
atttttaata gtaggttttt tgggatggaa ttttataagt atattacgtt ttgttttgta     3840
aattaagaat tatgttttat ttaattggaa aaatgaatag attttattag aagtagaatt     3900
tttgttatta ttttaagatt ttagttttgt aaagatttaa tatagaggaa gatatttggt     3960
tatattattt tttaaaataa taaatgtatt aaggacgata ttaaaataag aaattttttt     4020
ttttatgagt tttataaaag tgaatgtttt taagtttttt ttgttgcgat taatatgttt     4080
tgtttttttt gagtattttt agcgtgataa agaaatttgg gagtgggaga tggtaatatt     4140
tttgtattta tgatggaagt ttggatgttg tgtgttatat ttcgatttgt tttaaggaat     4200
gtgttttaat ttttagtaaa tagtatttta aggaaagttt tttttagttt tagtttatat     4260
agtgtgttat attataatat ttttagtaga gatgttgaat agtatttttt attttaaata     4320
tttttagttt gaaaagtaat tatttttgag tttataaaat ggattttcgt taaatttatg     4380
aagttagtag aaaaagggaa gaatattgta atatatattt tagatatata gttataaatt     4440
gtatttgatt taagattatt gggtatttta atattatttt aaatatattt tgtttaaaat     4500
agagtgaatg atttgtaaat tttttttgtag gattttaagg tttagttgtg ttaatgattt     4560
atagtttatt ttaattatgt ataaagaatg tagaagattt tagaaggtgg gggagttatt     4620
agaggtaagg agtttggatt tttcgattat ttggggaggg gttatatgag tgagaaataa     4680
atttttatta tgttaggtta ttaggatttg gagttggttg ttttagtaaa tagtttattt     4740
tgattaattt tagatatgtg gaagttaggt agatagagga aaggtaaaga gaattttggg     4800
aagtaggtat agaatgttta tcgggtatta aatggtagga tataatatgg taattgtaag     4860
gggattatta tgaatagaat aggagtaagt gtgggtatag aagtatatga gattagagaa     4920
gtaaattaat ttattaatat tattattgtt gtttttaggt tttttttttt tagtttattt     4980
taaaatagtt attatgtttt attgaggtgt aattttagta ttatatagtt tatttaaagt     5040
attagtttat tgatttttta tgtatttaga gttgtgtaat tatta                     5085
```

<210> 42
<211> 8222
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 42

```
aagattagat gtaattttgt taagtagtta ttttgtaaat tgtatagttt tatgtagatg       60
gaaggaaggg tttgtgttta ttttgattat agtattaaat aaattgtatt gtatttttat      120
tttttttagt tattttttta aaaagatttt gagtttttttg aatataggaa ggtgttttat      180
ttgattttgt tatttttagt atgtagtagt gtttgatata tagtaggtgt tttattattg      240
tgagagggat ggatggatgg gtggagttat agatggatag aaggatagat ggagggatgg      300
gtggatgatg gatggataga tggatggagg ggggatgatg aatggaggga taatgagtgg      360
atgaatgagg gaatgggtgg atggatggat ggagggatgg aggaatagat agatagatgg      420
agggatgggt gggtgatgga tggatagatg gatggaggga gggatgatga atggagggat      480
aatgaatgga tgaatgaggg gatgggtgga tggatgaatg gagggatgat gggtggatga      540
atgaattgag ggatggatgg atgaatatat ggatggatgg atagatggat agatggagga      600
attggtggat tttggatgga tgggtggatg gatagatgaa tgaatgtttg gatagataaa      660
gagatgatgg atagatgaat agatgaatta agggatgtcg gatagatgga gggattgata      720
gatgttggat ggatgggtgg tggatggata gatgagtgaa tgtatggata gataaagaga      780
tgatggatgg atgaattaag ggatgataga tggatggatg gatgagtaat tggatggata      840
agtggataaa tggatagatg gttgaatatt tgaatggatt gaaggaggat gtatggatgt      900
aagataaggt taattatttt ttattttttt tttttgtaaa attatttatt tatttattta      960
ataaatattt atttagttta aatttggtat aaagtattat gtgaggttta agagatacgt     1020
gggttaataa aatagagttt ttgttttttt gaaaattgta aagaaagggg cgtggttttt     1080
tgagtttaaa ttttaatttt gttagcgatt agttgtatat tagtgatgtt tttttatttt     1140
tttttaatta aatagggata atgttagtat ttattatatt gggaggtttt gcggggatta     1200
aatgagttat taaatgttaa gtgtttggga tagggtttgg tatttagtaa agtttttttgt     1260
gagtgttggt tgttattatt ttaatggaga agatggtatg aaaattagga aataggatgt     1320
tttttgggaa gtaatgtaat aggaatttat ataaagaaag gaaaggagga agtaattagt     1380
```

```
ggtgttttaa aggagtatgt taagaaaaat tttttagagg gaaatttttg agtagggtta    1440
tgaaaatagg agttttttaa gagattgtgg atttgtttgg gattatttgg ttataagtat    1500
aaaattattc ggtttttttt tgttattttt ggttgggtga ggggtttttg gtaaaggggt    1560
agaaggtgcg tgagaggttg cgaatggtta ggattgtttt ggggttagtc ggggtatttg    1620
gtggttaagt ttagaaatat gataggtttt tttgggaggg ttgatcgtag ggagcgttgg    1680
gttttaggtt gttggcgtcg gtttttgtgg tgtttttttt gtcggttatg agagtttaga    1740
tagtgtttaa tttttttttt ttttttttat acgtataatt attttatttt ttgtggtttg    1800
agttgttttg tttcgttata atggtatttg ttttaaaata gtttttttatg tgagggttag    1860
agaaaggaaa agattagatt tttttggat gagagagaga aagtgaagga gggtagggga    1920
gggggatagc gagttattga gcgatttttg ttaagtattt tagaaggtat aaaaacgttt    1980
ttgggattag gtagttttaa attttagttg ttggggttag gatatttagt gagtttatat    2040
ttgttttttt tgtttttttt agattgcgtt atggggttta gcgacgggga atggtagttg    2100
gtgttgaacg tttgggggaa ggtggaggtt gatattttag gttatgggta ggaagttttt    2160
attaggtaaa aggaagagat tttattgttt ttgttattta tattttaaga ttaagggtgt    2220
ttagttgtaa ggtggaaagt ttgtacgtgg ggtaggttag ttggttgtat tagttaaggg    2280
tgttagaacg gttatttgtt tttttttttgt ttttaagtgt tagggattgg atttaggaga    2340
gggaaaggag ttattttagg ttgatgttag tagttggagg aagtatgaga attaaattta    2400
ggatgtttag agtttattag gaagaatttt agaattatag atagttagag ttaataaggg    2460
ttttgagaga ttttgtatag ttattttttt tataggatga ggataaaaag ggattgagaa    2520
ggggaggata tttttagagt tatagtttat taaatgtttt taaagtgtta aggttaagat    2580
atgtttttta aggggagata gatttggttt tagatttggt tttgttattg agttattggg    2640
tgattttttgg gaaagtattt aatttttcgg agttttaatt tttttttttg tatagtgagg    2700
ggatatttta atatttatat tttagaggag atgtgagaat taaataaaat aatgtatgta    2760
agaggtttgg tatggttttt ggtatatatt gagttttaga aatgttagta gttattattg    2820
atgaagttta ggttagggat tttttaaagt attgtaatta gagaatagaa gatagaggtt    2880
tattagtgat tttcgatgtt gagtatgttt ttagtttgag aggtttgaat gatgtggttt    2940
gtaagtatat tttgtttttt attataaggg atttttagaat atattaaaga aaataaaatt    3000
ttgaggtttg taaatagagg gtggttgtgg tttgtatata gaagtttatt ttttcgttgt    3060
tttttatttt aaaggtgata tatttttttt ttggtttttt tttttattat tttgagttgg    3120
tttttttaga agtttaatag gttaagaatt aacgtttttg ttaacgggag gaaggaagtg    3180
ggcgtcgggg ttgttataag tgaatggatt gtttttggta ttttaatttg tagattaatt    3240
tttttttatt tgtgagttag agttaatttt ttttttttat ttcgtcgttt tttgggtttt    3300
ttttgggttt tatttatttt tagttttcgt ttatttcggg agtatggttg gttttggaag    3360
tttcgttatt taaaatttga gtcgttggtg attcgtgtta gaaatatttg aggaagaaga    3420
gttgagtttt ttgttgattg taatggtatc gtagtgtgtt tatgtttttt tttttttgtt    3480
tttgttattt ggttgtaata ggttttgttg gattgtataa agtgtttttt cgattaatat    3540
atatatataa attgatatta atttttgggt tatagatatg ttatgtgatt ttggataagt    3600
tttttttattt ttgggtttta tttttttgtt ggttgagcga agggattgtt ttttatggtt    3660
ttcgagattt cgttttacgt ttatgtttta gaatttttttg agtttttgat gtatttttgt    3720
ttttggcgag gaggtaggat agttaggcgt ggaggtagga gattagagtt tgtagagtag    3780
aggtttttttt aaggtgattt gggagttgtt agatttaagg tagtgatttg tacgttttga    3840
aagagattta gggtgttgta ttattaggga ggattacgga ggtttgtcgg gggtcgggag    3900
ttagggataa gatataatgt ttagggttgt tggtttttga aaggttttag aggtttggtg    3960
ttttgttacg ttttaggttg tgggatatgt agagattgtg ttagttggtt ttgttttttt    4020
agtatttggg gtatagggag gatggttttt ttgggggtag ggtggaggag gtttatgttt    4080
aggattgtaa atgttattcg tgagagttgg tattttgatt ttgttttaga tattgatttt    4140
ggatttttta attgattttg aaaggttatg tttttaattt tttgattgta aaagagggta    4200
aattttatga agtttagttt gtaaaatatt gaggttttta ttgtacgtat ataaatataa    4260
aattttagaa tatagaagtt ggaaggttat ttggagattt tggttttagg agtggggttt    4320
cggaagggag gggggttgttg agtgggtttt atattttttgt tttttttttt tttatttaaa    4380
ttttttttgt tttatttatt ttggttgttt tggggagcgg ggggaataaa ggattttaag    4440
gttataaaat gtttgaaaat tattagtggt ggttattatt ttttattata gggaggaatt    4500
gggtttgaga gtttttatcg gttaatggta gttataggta ggattaaaaa tttttgggtg    4560
atggtgatga taatgataat gataatgata atggtagaga tgatgaggag gagaaagata    4620
gtaattattt atttagtata tattgattgt tgggttttgt ttaagtgttt tatttattga    4680
agtttgataa taattttatg aggtagatat gattatgatt attatattta atagagaggt    4740
taagtaattt acgttaagtt atatagtaag taagaaagga gttggaattt aaatttaggt    4800
agtttggatt tagaattttt gttttttttt tttttttttg agatggagtt ttgttgggat    4860
tataggtgta tgttattatg tttggttaat ttttgtattt ttagtagaga ttaggtttcg    4920
ttatgttggt taggttggtt tcgaattttt gattttaggt gatttgttcg ttttggtttt    4980
ttaaagtgtt gggattataa gttaatgagt tcggtttaga atttttgttt ttgattatta    5040
tgttatattg ttttatgatt ttgttatacg taagacgggt tgttatttac gttttggttt    5100
ttttatttta gtagagttag aggggtgttt atggatttga taatgtgttt tatgttttat    5160
```

gtgagtgttt aattgggttt tagtttagag aatagtagga aaatggtttt tttttttttt 5220
gatttggatt gaagatttgt ttgatgaatt aggtttattg atagtagggt tgaagttgga 5280
aatataggtt agcggggttt tttgaaatat tagagtaaac gtttttcgtt tatttttata 5340
ggttgagggg tttttatttg tttatttttc ggattaggta aatttaggag aatggttttt 5400
tgtggttgtt tggggggttt ttagttgtaa ggtttgggtt tataggaggt aggtagttgt 5460
gtggtgtcgg aatgatttg cggggagata aattagttcg attttgtttt gttgtttaaa 5520
gtaaatatgg ggtggggtgg ggtggtttag gtttataatt ttagtatttt gggaggtagg 5580
atcggggaat cgtttgagtt taggagttcg agattagttt gagttatata gtgagatttt 5640
tttttttat aaaaaataaa taaaattagt tgggcgtggt ggtgtgtgtt tgtagtttta 5700
gttacgcggg aggttgaggt aggaggatta tttgggttta ggagattgag gttttagtga 5760
gttaagatta tattattgta ttttagtttg ggtaatagag taatatcgtg ttttaaaaaa 5820
atattaataa agtaaatatg agtttttttt ttggttgttt ggtgttgagt ggaaagaaag 5880
gtattggcgg gtttagattt ttttggttta tatatggatg agtaatgatt tagagaggtt 5940
aagtgatttt aatattatag agtatattgg cgttagaatt gggatcggaa tttagttttc 6000
gtaattgtta gttttatgtt ttttttttta gatattagag ggtaggggta ggttttaaaa 6060
tgtttgagat ttttagttgt tttgtggttt aaatttttgg ttttgttttg ttttagatag 6120
tttgttttta gcgttttgat ttttgattat cgtttgtgta tgttaggttt tgtatttgtt 6180
aggcgggagt ttaaggatta ttgtcgttag ataataatag ttaggagttt aggatttttt 6240
ggatgaaagg tgttagagat aagtcgttag tgacgtacga ggatttggat aaggttttgg 6300
agcgaggtgg taatgttggg tacggcggta gattatgttt aatatggggg aagggagtgt 6360
atgtggttta ggtttgtgcg tgtttttgtg tgtgtgtgta ggtgagtatg gcgtgtgttg 6420
ggatatattt atgtgtattt ttgtgtgagt gtgtaggttt atatgtgagt gtgtatatat 6480
atttgtgaga gtttgtatgt atgtatacgt gtgaggtgtt gatatatgtt tatgtaggta 6540
ttagtttgtt tgtaaatatt tttgtgtaat aataataaag ttcgaatagt tattaagagt 6600
atagatatga agttagattg tttgggttaa atttttagtt agttagtttt tcggtgtttt 6660
tgtttttttt tttgtaaaat ggcgtttatt ttattaggat tttaaaatta gttaatatgg 6720
ttgggcgttt gtaattttag tattttggga ggttgaggta ggcggattat aaggttagga 6780
gatcgagatt attttgttta atatggagaa ttttgagaat tgtttaaatt taggaggtgg 6840
aggttgcggt gagtagagat tgtattattg tattttagtt tgggtaatag agttagattt 6900
tattttaaaa aagaaaaata aaaaataaaa aaattatgaa tttattttta ggttgaggag 6960
tttagtattt tggttgtgaa atattttttt tataaaattt tgggatggag attacgggga 7020
ttaggtgttt ttttgtgata atttttgggt atggtggttt agggcgtaaa ttggagtgtg 7080
gttataatat atattgtgta tttttataag gatgttatag agtttgggta ttataaaaga 7140
ggagtttttt aaggaattga aattattaga taggagagag agttttgggt agatagggtt 7200
gttcgtgtta aatattttag ttgtggtata agggaaaggg tgggagttat gaaattgttt 7260
tattttgggt ttaggtttgg gttttgtcgt tagttagtta agtgattttg gttatttatt 7320
tttgtggttt tttatgagta aaaggcggaa atttattttt atttagaggg taggtttgat 7380
tttttttaat tagtatttat ttgtttatag taggaaggat tgaggtttaa agttggaggt 7440
gggtaggaag gattgaggtt taaagttgga ggtgggtagg aaggattaag gtttaaagtt 7500
ggaggtgggt aggaaggatc gaggtttaaa gttggaggtg gttgtttaga gttttagtag 7560
aggtttttgg ggtattttat tgagtgtttg gtaggagtgg gtgtttgttt tagggttggg 7620
ttgagttgtt tttattagga tttttcgtta tttgtatagt gaggggattg ggaggtttag 7680
agagttatag tttgggttta aaataagtaa gaggtttttg agtgtgagga ttgttttgga 7740
gtggaatggt ttttataggt aggagtgagt tttttgtagt tagaggtatt taagtagttg 7800
aaggataatt tttgggtagg aagttgtaga gatggtcgta gcgtggatta gaattgttgt 7860
tttggttatt tagattttat tttagtttgg tttttttgga tagtattttt gtaatagtga 7920
gttggtgatt ttacgtttta gaatttcggt ttttatattt gtaaaatggg aattatatga 7980
tatttattat gtgttagata ttttgttggt atatagtata tattatttta tttaattttt 8040
taagtaggga taagttattt ttattttta tatgaggaag ttgaggtata gagaggtgaa 8100
gtgaatggtt taaggttata tagttgggaa gatagggagt taaatttgaa ttttagtttg 8160
gttgttttta gattttatat cgtatttttt atgtcgattt tagttttttt tgtgtttata 8220
gg 8222

<210> 43
<211> 8222
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 43

```
tttgtgggta tagggaaggt tggagtcggt atgggaggtg cggtgtgagg tttgggggta     60
gttagattag agtttaagtt tagttttttg tttttttagt tgtgtgattt tgggttattt    120
attttatttt tttgtgtttt agttttttta tataagggat ggggataatt tgtttttatt    180
tgaaggatta agtgagatag tgtgtgttat gtattaatag ggtgtttggt atatagtgag    240
tgttatataa tttttatttt atagatgtgg aaatcgaggt tttgaggcgt aaagttatta    300
gtttattatt gtaggggtgt tgtttagaga agttaggttg gaatgaggtt tgagtgatta    360
aaatagtagt tttagtttac gttgcgatta tttttgtagt tttttgttta gggattgttt    420
tttagttgtt taaatatttt tagttatagg aggtttattt ttatttgtga gggttatttt    480
attttagagt aatttttata tttagaaatt ttttgtttgt tttgagttta agttgtgatt    540
ttttgaattt tttagttttt ttattgtgta gatgacgaag ggttttggtg ggagtaattt    600
aatttagttt tgagataggt atttattttt gttaggtatt tagtgaggtg ttttagaggt    660
ttttgttggg atttgagta gttattttta gtttagatt tcggtttttt ttgtttattt    720
ttaattttag atttggtttt tttttgttta tttttagttt tagattttag tttttttgt    780
ttatttttag ttttagattt tagttttttt tgttgtgagt aggtgggtgt tggttaaagg    840
gagttagatt tgtttttttgg gtaggagtga gttttcgttt tttatttatg gaagattata    900
gagataagtg gttaaggtta tttggttagt tagcggtaga gtttagattt aaatttaaaa    960
tggaatagtt tttataatttt tattttttttt tttgtgttat agttgaaatg tttggtacgg   1020
gtaattttgt ttgtttaggg ttttttttttt tgtttaatgg ttttagtttt ttgaaaagtt   1080
ttttttttat gatatttagg ttttgtgata tttttgtaaa agtatatagt atgtattgtg   1140
gttatatttt agtttgcgtt ttgagttatt atgtttagaa gttgttataa ggaagtattt   1200
gattttcgta gtttttattt tagggtttta tgaggagggt attttataat taggatgttg   1260
agtttttaa tttgaaaatg agtttatggt tttttgttt tttgtttttt ttttttgaga   1320
tggaatttgg ttttgttgtt taggttggag tgtagtggtg taatttttgt ttatcgtaat   1380
ttttattttt tgggtttgag taatttttag aatttttat gttaggtagg atggtttcga   1440
tttttttgatt ttgtgattcg tttgttttag tttttttaaag tgttgggatt ataggcgttt   1500
agttatatta attgatttta aaattttgat ggggtagacg ttattttgta gaggaagaaa   1560
tagaggtatc gaaagattaa ttagttgggg atttaattta ggtagtttgg ttttatgttt   1620
atatttttga tgattattcg gatttttgtta ttgttatata gagatattta taggtaaatt   1680
gatatttata tggatatgta ttaatatttt atacgtgtat atgtatgtag gtttttatag   1740
atgtgtgtgt atatttatat atgggtttgt atatttatat agaggtatat ataaatatat   1800
tttagtatac gttatattta tttgtatata tatatagaga tacgtataag tttgaattat   1860
atatattttt tttttttatg ttgggtatgg tttgtcgtcg tgtttaatat tgttatttcg   1920
ttttaggatt ttatttaaat tttcgtgcgt tattgacggt ttgtttttga tattttttat   1980
ttaagggttt ttgagttttt gattattatt atttggcgat aatgattttt gaattttcgt   2040
ttgatagatg taagatttgg tatgtatagg cgatggttag aggttaggac gttgaaagta   2100
gattgtttga ggtagagtag ggttaagaat ttgggttata aggtagttgg gggttttaga   2160
tattttgggg tttgttttttg tttttttgata tttagggaag agaatatggg attgatagtt   2220
acggaagttg agtttcggtt ttagttttgg cgttaatgtg ttttgtgatg ttgaagttat   2280
ttagtttttt tggattattg tttatttata tgtaaattaa aagggtttag attcgttaat   2340
gttttttttt ttatttaata ttagatagtt agggagagag tttatattta ttttattaat   2400
attttttttga gatacggtat tgttttgttg tttaggttgg agtgtagtgg tgtgattttg   2460
gtttattgga gttttaattt tttgggttta agtgattttt ttattttagt ttttcgcgta   2520
gttgggatta taggtatata ttattacgtt tagttaattt tgtttatttt ttgtagagaa   2580
ggggggtttt attatgtggt ttaggttggt ttcgaatttt tggatttaag cgatttttcg   2640
attttgtttt ttaaagtgtt gggattatag gtttgagtta ttttatttta ttttatattt   2700
attttaaata gtagagtaga atcgggttaa tttgtttttt cgtaagatta tttcggtatt   2760
atatagttgt ttgttttttg tgggtttagg ttttgtagtt aggagttttt taggtagtta   2820
tagaaggtta tttttttgga tttgtttgat tcggaaaatg aatagatgaa agttttttag   2880
tttgtggaaa tggacggagg gcgtttgttt tagtatttta gaaagtttcg ttggtttgtg   2940
tttttagttt taattttgtt gttagtgggt ttggtttatt agatagattt ttagtttaag   3000
ttagagagaa gggaggttat ttttttgttg tttttttgaat tgaggtttaa ttggatattt   3060
atatggaata tggagtatat tgttagattt atgaatattt ttttggtttt attagaataa   3120
aagaattaga gcgtgggtgg tagttcgttt tgcgtgtggt aaggttatgg ggtagtatag   3180
tatagtggtt aagagtaagg attttgggtc gggtttattg gtttgtaatt ttagtatttt   3240
gggaggttaa ggcgggtaga ttatttgagg ttaggagttc gagattagtt tggttaatat   3300
ggcgaaattt agtttttatt aaaaatataa aaattagtta ggtatggtgg tatgtatttg   3360
taattttagt aagattttat tttaaaaaaa aaaaaaagga gtaaggattt tggatttaag   3420
ttgtttgaat ttgaatttta gttttttttt tatttgttgt gtgatttggc gtaagttatt   3480
taattttttt gttaaatgtg gtgattataa ttatatttat tttataagat tgttgttagg   3540
ttttagtgag tgaaatattt aaatagagtt tagtaattag tatgtgttga ataaatggtt   3600
gttgtttttt tttttttat tattttttatt attattatta ttattattat tattattatt   3660
attatttagg aatttttggt tttgtttgtg gttgttatta atcggtggag atttttaggt   3720
ttagtttttt tttgtaatga gaagtagtga ttattattgg tgatttttaa atattttatg   3780
```

```
attttgaaat tttttgtttt tttcgttttt taaaatagtt aaagtaaata aaataaaaaa 3840
ggtttgagta aagaaaggaa aaataggggt gtggagttta tttagtagtt tttttttttt 3900
cgaagtttta tttttggagt tagaattttt aagtgatttt ttagtttttg tgttttagaa 3960
ttttatgttt gtgtacgtgt agtgaaggtt ttagtgtttt atagattggg ttttatggaa 4020
tttgtttttt tttataatta gaagattgga gatataattt tttaaggtta gttagaaaat 4080
ttagagttag tatttagaat aaagttaaga tgttaatttt tacgggtggt atttgtagtt 4140
ttgggtatga gtttttttta ttttgttttt agggaggtta ttttttttgt attttaaata 4200
ttgagagggt agaattagtt ggtatagttt ttgtatgttt tataatttaa gacgtgatag 4260
ggtattaggt ttttgggatt ttttagggat tagtaatttt aggtattatg ttttattttt 4320
ggttttcggt tttcggtaaa ttttcgtgat tttttttgat gatgtaatat tttgagtttt 4380
ttttaagacg tataagttat tgttttaggt ttggtagttt ttaaattatt ttggaaagat 4440
ttttgttttg taaattttgg tttttttattt ttacgtttga ttgttttgtt ttttcgttaa 4500
aggtaaaagt gtattaagga tttagagaat tttagggtat gagcgtggga cgggatttcg 4560
gagattatgg aagataattt tttcgtttaa ttagtagaga aataaggttt agaggtggag 4620
agatttgttt aaggttatat ggtatatttg tggtttagga gttgatgtta atttgtgtgt 4680
gtgtgttggt cggggggagta ttttgtgtaa tttaataggg tttgttgtag ttagatgata 4740
gggataggag aagaaagata taaatatatt acgatgttat tatagttaat agaaaattta 4800
attttttttt tttaagtgtt tttagtacgg attattaacg gtttaaattt tagataacgg 4860
agtttttagg attagttatg ttttcgaggt agacggaagt tggaaatggg taaagtttaa 4920
gggagattta aaggacgacg gagtggaaga ggaaaattgg ttttggttta taaataagga 4980
gaaattaatt tgtaaattaa agtgttaaag ataatttatt tatttgtggt aatttcggcg 5040
tttatttttt tttttcgtt ggtagaaacg ttgattttta atttattaga tttttgaggg 5100
aattagttta gaatggtgag ggaaggggtt aagagaagag tgtattattt ttgggataga 5160
aggtaacgag gagatgagtt tttatgtata aattatagtt atttttttatt tataaatttt 5220
agaatttgt tttttttggt gtattttgga atttttgtg gtagaaggta ggatatattt 5280
gtagattata ttatttagat tttttaaatt agagatatat ttaatatcga aggttattaa 5340
tgagttttta tttttttgttt tttaattgta atgttttgaa aggtttttag tttgggtttt 5400
attagtaata gttattaata tttttaggat ttagtatatg ttaggaatta tgttaggttt 5460
tttgtatgta ttattttatt taatttttat atttttttta ggatatagat attaggatat 5520
tttttattg tataggagag gaaattgagg tttcgagagg ttgagtattt ttttaaaggt 5580
tatttagtgg tttagtggta gagttaagtt tagaattaga tttgtttttt tttgaagagt 5640
atgttttaat tttgatattt taagagtatt taatgagttg tgattttgga aatgtttttt 5700
tttttttagt ttttttttgt ttttattttg taagagaggt ggttgtataa aatttttttag 5760
gatttttgtt aattttgatt gtttataatt ttaaaatttt ttttggtgga ttttgagtat 5820
tttaggtttg atttttatgt tttttttagt tgttgatatt agtttgaaat ggtttttttt 5880
ttttttttga gtttaatttt tgatatttaa aagtaaagaa aaagtaagtg atcgttttaa 5940
tatttttaat taatgtagtt aattgattta ttttacgtgt aaatttttta ttttgtagtt 6000
gaatattttt gattttaggg tgtgggtggt aggggtaatg gaattttttt tttttatttg 6060
atgaggattt tttgtttatg gtttgggatg ttagttttta tttttttttta gacgtttagt 6120
attaattgtt atttttcgtc gttgagtttt atggcgtagt ttgaagaaga taaaaagagt 6180
aagtatgggt ttattgggtg ttttggtttt aatagttggg gtttgaggtt gtttggtttt 6240
aagggcgttt ttatattttt tgggatgttt gataaagatc gtttaatggt tcgttgtttt 6300
ttttttttgt ttttttttat tttttttttt ttatttaggg agggtttaat tttttttttt 6360
ttttagtttt tatatgggaa gttattttag ggtaggtgtt attgtggcga ggtaggatag 6420
tttaggttat agggggtggg gtggttgtgc gtgtggaaag aaggggagga ggttgggtat 6480
tgtttggatt tttatagtcg atagaaaggg tattatagaa gtcgacgtta gtagtttgaa 6540
atttaacgtt ttttgcggtt agtttttta agaggatttg ttatgttttt aagtttggtt 6600
attaggtgtt tcggttggtt ttaggatagt tttggttatt cgtaattttt tacgtatttt 6660
ttgttttttt gttagagatt ttttatttag ttagaagtga tagaaaggaa tcggatggtt 6720
ttgtgtttat agttaggtgg ttttaggtaa gtttataatt ttttagagaa tttttgtttt 6780
tatgattttg tttaaaggtt tttttttgaa aagttttttt tgatatattt ttttgagata 6840
ttattaattg tttttttttt tttttttttt gtgtaagttt ttgttgtatt gttttttaaa 6900
gggtatttta tttttttggtt tttatgttat ttttttttatt aggataatag tagttagtat 6960
ttataagaga ttttgttggg tgttaggttt tgttttaaat atttggtatt tggtaattta 7020
tttaatttc gtaagatttt ttaatgtgat aggtattgat attattttta tttaattgag 7080
agaaagtagg gaaatattat tgatgtataa ttagtcgttg gtagagttgg gatttgaatt 7140
taggaagtta cgtttttttt tttgtagttt ttaggagggt aggagttttg ttttattaat 7200
ttacgtattt ttttgggtttt atatggtgtt ttgtgttaag tttgaattga ataaatgttt 7260
attgagtaaa tgggtggatg gttttgtaaa gaaagagagt ggaggatgat tagttttatt 7320
ttatatttat gtattttttt ttaatttatt taggtattta attatttatt tatttattta 7380
tttgtttatt tagttattta tttatttatt tatttgttat tttttaattt atttatttat 7440
tattttttg tttatttatg tatttattta tttatttatt tattatttat ttatttaata 7500
tttattaatt tttttattta ttcgatattt tttaatttat ttatttattt atttattatt 7560
```

tttttgttta tttaggtatt tatttattta tttatttatt tatttattta aaatttatta 7620
gtttttttat ttatttattt atttatttat ttatgtgttt atttatttat tttttaattt 7680
atttatttat ttattatttt tttatttatt tatttattta tttttttatt tatttattta 7740
ttattttttt atttattatt ttttttttta tttatttatt tatttattat ttatttattt 7800
ttttatttat ttatttgttt ttttattttt ttatttattt atttatttat tttttttattt 7860
atttatttat tattttttta tttattattt ttttttttatt tatttattta tttattattt 7920
atttattttt ttatttattt ttttatttat ttgtaatttt atttatttat ttattttttt 7980
tatagtgata gagtatttat tgtgtgttag atattgttat atgttgagga taataaaatt 8040
aaataaaata ttttttttgtg tttaaggaat ttagagtttt tttagggaga taattaagag 8100
gaatgaaaat atagtatagt ttgtttagtg ttatgattaa ggtaggtata ggtttttttt 8160
tttatttgta taagattata tagtttataa agtggttgtt tggtaagatt atatttaatt 8220
tt 8222

<210> 44
<211> 3051
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 44

atagtggttt atgtttgtaa ttttatattt tgggagatcg attgggaaga ttgtttgagt 60
ttaggagttg gagattagtt agagcgatat agtgggattt ttttttttata aaaatattta 120
aaaattagtt aggtatagtg gtgtattttt gtagttttag ttatttggga ggtggtaaga 180
ggatttttcg agtttagaag ttggaggtgg tagtgagtag ttattttgtt attgtatttt 240
agtttgggtg ttaaagggag attttttttt ttagaaaata ataaaaaaaa aagtttgata 300
gttttttttgt ttgtgttata taaaataatg gtatatatta taattgaagg tattttataa 360
tagaaatgtt tttttttgtt tttttttaag gttgatttag tgttttaaga ggttgatata 420
gaagggtaaa gttaagtttt tataaaattt agggaagaga ttgtgaaatt tattttagaa 480
ttttgtatgg agttatagtt gaattaggaa aaaaaaaaaa aaaaaaaaaa ggaaagaaag 540
gtattttaga gataaagaat agattaagga gaggagatat ttgaagttat aatgattgag 600
aatatgttag atttgaaatg aatttttagt ttttttaata agataaataa aattaatttt 660
atatttagat atatggtaga aaaattaaag aattttgttg attaaggtat taaaagtaat 720
taaagagaag tggtgtgaag aaagtaagag agaaataata aatttgtttt attttgtaat 780
aattgaaaat ttttggttgg gcgtggtggt ttacgtttgt aattttagta ttttgagagg 840
tcgaggtagg tggattattt taggttaggt gtttaagatt agtttggtta atatggtgaa 900
atttcgtttt tattaaaaaa aaataataat aataatataa aaattagtcg gggtggtgg 960
taggtatttg taattttaga tattcgggag gttgaggtag gagatttatt tgaatttggg 1020
aggcggaggt tgtaatgagt tgagatcgcg ttattgtatt ttagtttgga tgatagagta 1080
ggattttatt ttaaaaagaa aggaaaagaa aagaaaaaat attaaatgtg tacgtttttt 1140
gatttagttg tattatttta aggagttgat attattaaaa ttgtttaagt gtttaaaggt 1200
gtttgtagtt aaataatagg agattgataa attatgttat atatatgtga tgttatgttt 1260
taaagaggta ttgatatgat aaaagatgta cgtggtataa aattaaatgt attttattaa 1320
gtattttttt aagtgtttac ggaatgagtg tatttttgaa aaaaaaaaag tgtattcgaa 1380
tttttaaaaa agttttaaaa gttttatata atgaacgatt gagtgattat aagagttggc 1440
gggggaatgt taagaggatg atagggagtt aagtttaata gaataattta ttttttttatt 1500
ttgtgatatt tacgagcgta ttaattttgt aattgaaaaa taaagtgtat atttgtagta 1560
gttgtatttt ttttaggttg taaggaggtt tttttttttcg gtaggtttga tttgtatttt 1620
atttttattt tcgtggttgg aaatttttta tttacgtagt gggaggttga ggagttatta 1680
taaagttggg gtttgacgag tcgggatcgg gattcgattt ttatatatgt tcggatttgt 1740
tttgcggtcg ggtttaggag ttaaagaggc ggggagattt gcgcgacgtt gtttcgtttt 1800
gcgttcgttt tttttaatgt atgttttagg gggcgggttt cgcggggagt atggatacga 1860
ttggttttaa agttttttttc gtaaggtcgt gggttggata gcgtggtgac gtcgtaacgc 1920
ggcgtagggt gagagcgcgc gtttgcggac gcggcggtat taaacggttg taggcgtagt 1980
agagtggtcg ttgttttttt aggttttagt cggtcgtcgc gacgttcgtt cgttcgtttt 2040
gaggttttttg aagtcgaaat tagttagatt tttttttttt tcgtttgttt gtagcggcgt 2100
tgttgttatt tcgttattat gttcgaggcg cgtttggttt agggttttat ttttaagaag 2160
gtgttggagg tatttaagga ttttattaac gaggtttgtt gggatattag ttttagcggt 2220
gtaaatttgt agagtatgga ttcgttttac gtttttttgg tgtagtttat tttgcggttt 2280
gagggtttcg atatttatcg ttgcgatcgt aatttggtta tgggcgtgaa ttttattagg 2340
tgagtttcgc ggtttcggga agtcggtttc ggttcgtttg tattttcggt gtttggcggg 2400

agcgttttcg agtttagttt ttattggttg gcgtgggtta ttcgcgtttt tttattggtt 2460
tgttacgtag tggggtgggg tttagttgag cgcgcggttc ggaaaagttc gcgttggttg 2520
ttgcgcgaat ttgtttttc gcgttaaagt tataaagcgg gtggtggcgg gaaaattaag 2580
ggtttttcg tagtgttagg aatattgttt tagggttttt tgtttattaa atttgttgg 2640
ttttgaatgg acgttttagt tgtggttttt ttgtttttga gacggtttcg gtgtgttgtt 2700
cgggttggtt tttaatttt gggtttaagc gatttttcg gtttagtcgc ggttgatttt 2760
aaatgtttta taatgttttt gcgagaaatg tggtagtttg ttattttatt tagtggtagg 2820
agattgtttt tatttagaag ggatattgtt ggtggtattt tagtataaat attgttagat 2880
gcgttttaaa acgtttgtat taataatggt atttttagt agttcgttta tttttatta 2940
gttttgagac ggtttgatgg gtgagagtgg taatttttt taatcgcgtt cgaaatatag 3000
tttttagta gacggcgttg attttaaagt atgtgttttt tgtttttag t 3051

<210> 45
<211> 3051
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 45

attagaagat aggagatata tgttttaaaa ttaacgtcgt ttgttgaagg gttgtatttc 60
gaacgcggtt agaaggggtt attattttta tttattaggt cgttttagaa ttggtggagg 120
gtaagcggat tgttggagga tgttattatt aatgtagacg ttttgggacg tatttggtag 180
tatttatatt aaaatattat tagtagtgtt tttttggat agaaataatt ttttgttatt 240
aagtaggatg ataggttgtt atatttttcg taagggtatt ataaagtatt taaagttaat 300
cgcgattgag tcgggaggat cgtttgagtt tagaagttgg agattagttc gggtaatata 360
tcgagatcgt tttagaaata agaaagttat agttaaagcg tttatttaag gttaatagga 420
tttagtgagt aaagagtttt ggaatagtgt ttttggtatt gcggaaaaat ttttgatttt 480
ttcgttatta ttcgttttgt gattttggcg cgaaaaagta ggttcgcgta gtagttagcg 540
cgggtttttt cgaatcgcgc gtttagttgg gttttatttt attgcgtggt aggttaatga 600
gaaggcgcgg atggtttacg ttagttaatg agggttaggt tcgaaagcgt tttcgttaag 660
tatcggaggt gtaggcgggt cggggtcggt ttttcggggt cgcgaggttt atttggtgag 720
gtttacgttt atggttaggt tgcggtcgta gcggtaggtg tcgaagtttt tagatcgtag 780
ggtgagttgt attaaagaga cgtgggacga gtttatgttt tgtaggttta tatcgttgga 840
gttaatattt tagtaggttt cgttgatgag gtttttgagt gtttttaata ttttttgag 900
gatggagttt tggattaggc gcgtttcgaa tatggtggcg gagtggtaat aacgtcgtta 960
taggtaggcg ggaaggagga aagtttagtt ggtttcggtt ttaggagttt tagagcgagc 1020
gggcgaacgt cgcgacgatc ggttgagatt tagaaagata acgattattt tgttacgttt 1080
gtaatcgttt aatgtcgtcg cgttcgtaag cgcgcgtttt tattttgcgt cgcgttgcga 1140
cgttattacg ttgtttagtt tacggttttg cggggaagat tttagggtta atcgtgttta 1200
tgtttttcgc gaggttcgtt ttttagagta tatattggag gaagcgggcg tagggcgggg 1260
tagcgtcgcg taggtttttt cgtttttttg atttttgaat tcggtcgtag aataagttcg 1320
ggtatatgtg gagatcgggt ttcggtttcg gttcgttaag ttttagtttt atggtggttt 1380
tttagttttt tattacgtgg gtagaaagtt tttagttacg aaagtgaaag tgaaatgtaa 1440
attaagttta tcgggaggaa aagttttttt gtagtttgaa gagagtatag ttgttgtaaa 1500
tatgtatttt atttttaat tatagaattg atgcgttcgt aggtgttata agataaagag 1560
gtgaattgtt ttgttaaatt tagtttttta ttattttttt aatatttttt cgttagtttt 1620
tataattatt taatcgttta ttgtataaag tttttaaagt ttttttaaaa gttcgaatat 1680
atttttttttt ttttaaaaat gtatttattt cgtaaatatt tggaaaagta tttaataaag 1740
tatatttaat tttatgttac gtatattttt tattatatta gtattttttt aaaatatagt 1800
attatatgta tataatataa tttattaatt ttttgttgtt taattataaa tatttttgag 1860
tatttaggta atttggtga tattaatttt ttgaagtaat atagttgagt taaagagcgt 1920
atatatttaa tattttttttt tttttttttt ttttttttttg agatggagtt ttgttttgtt 1980
atttaggttg gagtatagtg gcgcgatttt agtttattgt aattttcgtt ttttaggttt 2040
aagtgagttt tttgttttag tttttcgagt atttgggatt ataggtgttt attattattt 2100
tcggttaatt tttgtattat tattattatt tttttttagt agagacgggg ttttattatg 2160
ttggttaggt tggttttgaa tatttgattt gaggtgattt atttgtttcg gtttttttaaa 2220
gtgttgggat tataggcgtg agttattacg tttagttaga aatttttaat tgttatagga 2280
tggataggat ttgttgtttt ttttttgttt tttttatatt attttttttt agttattttt 2340
aatattttgg ttagtagaat tttttagttt ttttattatg tatttaggta tggagttagt 2400
tttatttgtt ttgttgaggg aattgaagat ttattttaag tttgatatat ttttaattat 2460

```
tatggtttta aatattttt tttttagtt tattttttat ttttggaatg ttttttttt     2520
ttttttttt ttttttttt tttttagtt tagttgtgat tttatataag gtttaagat     2580
gagttttata gttttttttt tggattttgt ggagatttaa ttttattttt ttgtattagt     2640
tttttaaagt attgggttag ttttaaaagg gaataggaaa gggtattttt attataagat     2700
gtttttaatt gtaatatgta ttattatttt atgtagtata agtaagaaaa ttgttaaatt     2760
tttttttta ttatttttta gagaggggag tttttttttg atatttaggt tggagtgtag     2820
tggtaagatg attatttatt gttattttta atttttaggt tcgagagatt tttttgttat     2880
tttttaaata gttgggatta taggggtgta ttattgtatt tggttaattt ttaaatgttt     2940
ttgtagagag aaggttttat tatgtcgttt tggttggttt ttaatttttg ggtttaagta     3000
atttttttaa tcggtttttt aaagtgtgag attataggta tgagttattg t     3051
```

<210> 46
<211> 3664
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 46

```
gaatttttaa ttattatttt gttttttat ttttaatatt tttagcggta attgtatttt     60
atttattttt gtgtttatga agtatagtgt tgtattttgg agatattata tagaagttgg     120
tttaaagggt aataaattgt atttgttaag atgatagtat ggatttataa taatttttga     180
aattttataa agaaagatga ttgagttaaa ttgatatatt tagtattata gttgtggaag     240
tttgtggttt tttttatgtt aaaggtaaaa tggatataat gaattagttg ttatttttag     300
atgatataga agttgaattt tttttaagtt ttttaaagag aaagatatat taaaatttat     360
taaaattagt attataaatt gtatagaata gtttggtttt ttagagtatt tttttggggt     420
agtgagtttt tatttaaaaa atgaagtttg gattttaaat ataagtttta aaagtgatta     480
ggtttagta ggagtttta aatttttatt tatattatga tttttaaatg ttttgttttt     540
gttgtttagg aataaaaatt gttaaggttg agttagatgt aatgtataat attagatgat     600
agatgtagtt tattgtgtta aaaggtgtta aatatttaag tgtatgtgat atattttata     660
ttataagggt aaggaagttt tattttatat tttgatttgg gtttttaat atatatttgt     720
agtggatgtg gtaattagtt tttgttttat gttttattag gattaatgta attagaaatt     780
tttaaaatgg atttttatta tgtttagttt tgttttattg ttttatttgt ttattttaaa     840
aagattttag aatggtgttt aggttgggtt ggtggtttac gtttgtaatt ttagtatttt     900
gggaggttaa ggtaggagga ttgttggagt ttaggagttg gagattagtt agggtaatat     960
aaggagatat tgttttcgta aataaataga aaaaaaaaaa gtaagaaaga aagagagaaa     1020
gaaggaaaga ataagaaaaa ggaaaaaaaa attaattgta gtaagtgtag aaatttttttt     1080
taaggatatg atggatggta atgaagatag agtttttgat attggattat ttaaagtata     1140
atttaagttt ttttttttt ttttatagaa ttgtgaattt ttgtgtttta attatattta     1200
agttaggcgt ggtggcgagt gtttgtagtc gtagttgcgt tggaggttga ggtcgattgt     1260
ttgagtttag gatttggagg ttagtatgcg taatataatg agatttagtt tttaaatgta     1320
tgtttttttt tatatattta aaatttgat gtgaaaatat tttaaaattt aatatatttt     1380
aaatgttttt aattgtataa taaataaaat gtaaataata aaataattta atattaaatt     1440
taaaaatgag gtagaaataa agtatagcga tataaataat aaattttttt ttatattttt     1500
gaggcggttt tttgagtttt ttattttttt tttaaggtta ttgaaatgtg tttttttggag     1560
ttagttcgta aattacgtat ttagaaaaat ataattatat atttttaatt ttaagtatta     1620
gaagtgaaag taatggaatt tcgatgtaaa tataatatta ttttttttgat gagttatttt     1680
gagtataata aatttgaatt gtgttaatgt tgggagaaaa aatttaaaag aagaacggag     1740
cgaatagtag tttttttgttt cgttgattag aaatagtagg acgatatttt ttcgattgga     1800
ggagagcgtt tgcgttcgta tttagttggc gttcgttttt ttgtttttttt tttagtcgtt     1860
ttttttttt tttttcgcgt tttagttatt cgggaaggtt tgtttagcgt agttgggttt     1920
tgattggttg ttttgaaagt ttacgggtta ttcgattggt gaattcgggg tttttttagcg     1980
cggtgagttt gaaattgttc gtatttggtt ttaaagttgg tttttggaaa ttgagcggag     2040
agcgacgcgg ttgttgtagt tgtcgttgcg gtcgtcgcgg aataataagt cgggtatagt     2100
ggttggggtt agggtcgtgt ttaggggacg gtcgagggtt tcggagggcg agtattgagg     2160
aacggggttt tttaagaagg tcggattgga ggttagggat ttgcgcgggg ttcggttggg     2220
tttcgggggg cggtgggtag ggttttcgtt tgggtttggt cgtgtgagtt atattgggtt     2280
ggtttagag ggaggttatg ggagtttagt ttggcggggt taggcggcgt gggggtgggg     2340
gttcggggtt gtagttatga gtcgaggtcg gttgttttta ggaattgttt gaagaggttt     2400
tcgggttttg attgaagtaa aattcgtttt tttacgttga gcgtttgcgg agtagtaggt     2460
tttttttttgg gttcggtttt tgcgcgtttt gttatttcgt ttcgggggtg ggaaagtggg     2520
```

atcgtatttg ggttaggtat aggcgcgggt ttttagagtt aggtcgtttt gagaaatcga 2580
ttttggaatt cgtgggtttt tttgggtttg ttttgtttac ggtttcggtt tatttggagt 2640
tgttaagaat agttagttta ggtatttaat ttttatgagt agtgtagtgt agtttttttt 2700
atttaaaaag atatattttt gttttttttt ggattgattt tttttgaag atgaatgtga 2760
gaaatagaat ttaaaggttt attttgagtg tgttttataa atgattttat tattagtgat 2820
gggtgttaga aaaatttagg taattatgtt tggagttttg acgttttatt ggtaaatttt 2880
agaggaagtt ttgaattttt ggttgttagt tttttttttt aatttattta ttgtgattta 2940
agtatatcgt tttttgttt agtttttgat attgtttagg ttataattag aattttattt 3000
gtggaattgt atttttatt tttttgtttt acggtgttta agtgatattt tttattttg 3060
gaaaaagtat tttgaaagtt ttgagtatgt ttgtttgtga ttttagtaag tagaggaaaa 3120
agattaaaat tgttacgtgg gtaattgtaa atatttaaaa tgtttttgtc gttttaaata 3180
aaattttttt aatgaatagt ttgaatatat tttagttttg tttttataat tttaaaaaat 3240
aatgttttga ataaaattag gagtattata aagcggtata aatttgttga aatatttggg 3300
tataattttg gtatacgtag gtattatttt aaagtgttat aaaaagggaa tataattttg 3360
gtttttgttt ggaaagaata gataagttga tatttgaatt tgagggttat tttgattgga 3420
agaagttaaa tattatatta gtatagaata tatacgtttt taatgtttta ggagttaaga 3480
aggatggaaa gttattgtag gagtttttat ttttgtaaat attgtttgaa tgtaattaat 3540
atttatggaa tatttatgtt gtagtaggta ttgtggaaaa tgttttatat atagtgtttt 3600
attaatgttt aaaattattc gagttagtgg tatgtaatta agttagtttt tttttattt 3660
tagg 3664

<210> 47
<211> 3664
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 47

tttaaagtga aggaaaaatt gatttaatta tatgttatta attcgagtag ttttaagtat 60
taatgaaata ttatatgtaa agtatttttt atagtgttta ttgtagtata agtattttat 120
aaatattaat tatatttaaa taatatttat aagggtaagg atttttataa taattttta 180
ttttttttga tttttgagat attggaaacg tgtatatttt atattagtgt agtatttagt 240
ttttttaat taaaataatt tttaaattta ggtattaatt tgtttatttt ttttaaataa 300
aaattagaat tatgtttttt ttttgtgata ttttaaagta gtatttgcgt gtgttaaagt 360
tatatttaaa tattttaata aatttatatc gttttatgat atttttaatt ttatttaaaa 420
tattattttt taaagttatg aggatagaat taaaatgtgt ttagattgtt tattaggaaa 480
atttgttta aaacgataaa aatattttaa gtgtttatag ttgtttacgt gataatttta 540
attttttttt tttgtttgtt gaggttatag ataaatatgt ttaagatttt taaggtattt 600
tttttaagag taggaaatat tatttaagta tcgtaaaata aaagaatgaa aagtgtaatt 660
ttatagataa aattttaatt ataatttaaa taatgttaag gattaagtag aaaaacggta 720
tatttgaatt ataatgaatg ggttaaaaaa aaaagttgat aattagaagt ttaagatttt 780
ttttgaagtt tgttaatgaa acgttagaat tttaggtata attatttaga tttttttaat 840
atttattatt gatgataaaa ttatttataa agtatattta gaatagattt ttaagtttta 900
tttttatat ttatttttaa agaaaaatta atttagaaag aagtagagat gtattttttt 960
aaatgaaaaa aattgtatta tattgtttat gagagttaag tgtttgggtt gattgttttt 1020
aatagtttta ggtgggtcgg ggtcgtgggt agagtaagtt taagaaggtt tacgagtttt 1080
aggatcggtt ttttagggcg gtttggtttt agggattcgc gtttgtattt ggtttaggtg 1140
cggttttatt tttttatttt cgaggcggga tggtagggcg cgtaggggtc gggtttagga 1200
aagagtttgt tatttcgtag gcgtttagcg tgggggagcg gattttgttt taattaagat 1260
tcgaaagttt ttttaggtag tttttgagaa tagtcgattt cgatttatga ttgtagtttc 1320
gaattttat ttttacgtcg tttaatttcg ttaggttggg tttttatagt ttttttttaa 1380
agttagttta gtgtggttta tacggttaga tttaggcgaa ggttttgttt atcgtttttc 1440
gaggtttagt cgggtttcgc gtagattttt gatttttagt tcggtttttt tagaggattt 1500
cgttttttaa tattcgtttt tcgaggtttt cggtcgtttt ttagatacga ttttgatttt 1560
agttattgta ttcggtttat tatttcgcgg cggtcgtagc ggtagttata ataatcgcgt 1620
cgtttttcgt ttaattttta agagttagtt ttgaagttaa gtgcgagtag ttttaaattt 1680
atcgcgttaa agggtttcgg atttattaat cgggtagttc gtagattttt aaagtagtta 1740
attagagttt agttacgttg ggtaggtttt ttcgggtggt tagagcgcga aagaaagagg 1800
aaagggcggt tagagaaaaa gtaggagggc gggcgttaat tgagtgcgag cgtaagcgtt 1860
tttttttagt cgggagagtg tcgttttatt gtttttagtt agcggagtag gaagttattg 1920

ttcgtttcgt ttttttttta aatttttttt tttagtattg gtatagttta aatttattat 1980
atttaaaata gtttattaaa aaagtgatat tgtgtttata tcgagatttt attattttta 2040
tttttaatat ttagggttag gagtgtatag ttatgttttt ttaaatgcgt gatttgcggg 2100
ttggttttaa ggagtatatt ttagtgattt taagaaggaa atggaaaatt taaaagatcg 2160
ttttaaaaat gtaaaggaaa atttattatt tatatcgttg tgttttgttt ttattttatt 2220
tttgaattta atattaaatt attttattat ttatattttg tttattatat aattaaaaat 2280
atttgaaatg tattaaattt taaaatattt ttatattaga attttaaata tatagagaga 2340
ggtatgtatt tagagattgg gttttattat gttgcgtatg ttggttttta aattttgggt 2400
ttaagtaatc ggttttagtt tttagcgtag ttgcgattat aggtattcgt tattacgttt 2460
ggtttaaata taattaaaat ataaaaattt ataattttat gaggggagag aaagaggttt 2520
aaattatgtt ttaaataatt tagtgttaaa aattttgttt ttattgttat ttattatatt 2580
tttgagagag atttttgtat ttattgtagt taattttttt ttttttttt ttgtttttttt 2640
ttttttttt ttttttttt ttattttttt tttttttgtt tgtttgcgga gataatgttt 2700
ttttatgttg ttttagttgg tttttaattt ttaggtttta gtaatttttt tgttttggtt 2760
ttttaaagtg ttgagattat aggcgtgagt tattagttta atttaaatat tattttaaaa 2820
tttttttaaa ataaataaat agaatagtaa aatagagtta gatataataa aaatttattt 2880
taaggatttt tggttgtatt gattttaatg ggatatagaa taaagattga ttattatatt 2940
tattataagt atgtattaga agatttaaat taggatatgg aatggaattt ttttattttt 3000
gtgatataga gtatattata tgtatttaag tgtttaatat tttttaatat aatgagttgt 3060
atttattatt tggtgttata tattgtattt ggtttaattt tgataatttt tgtttttagg 3120
taatagaggt agagtatttg ggagttatgg tgtaggtagg aatttaagaa tttttgttgg 3180
agtttaatta tttttaaaat ttatgtttaa aatttaaatt ttattttttta aatgaaaatt 3240
tattgtttta gagaagtgtt ttagggaatt aggttgtttt gtgtagttta tggtattggt 3300
tttaatgaat tttaatatgt ttttttttt gagaggttta agaggaattt aatttttata 3360
ttatttaaaa atggtaatta atttattata tttattttat ttttaatata aagaagatta 3420
taagttttta tagttgtgat gttaggtgta ttaatttaat ttaattattt tttttataa 3480
agttttagag gttattgtaa atttatgtta ttattttggt aaatatagtt tattattttt 3540
tgggttaatt tttatgtagt atttttaaag tgtaatattg tgttttatag atataaaaat 3600
gaataagata tagttatcgt tggaggtgtt gagggtaggg gagtaggatg ataattggga 3660
attt 3664

<210> 48
<211> 1729
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 48

ttgtattttt ggttggggta ttttaattag aattgttaaa tttagtatat aaaaataagg 60
aggtttagtt aaatttgaat tttagataaa taatgaataa tttgttagta taaatatgtt 120
ttatgtaata ttttgttgaa attaaaaaaa aaaaaaaaag ttttttttt atttttattt 180
ttattattag gtttaaggaa tagggttagg ggttttaaat agaatgtggt tgagaagtgg 240
aattaagtag gttaatagaa ggtaaggggt aaagaagaaa ttttgaatgt attgggtgtt 300
gggtgttttt ttaaataagt aagaagggtg tattttgaag aattgagata gaagtttttt 360
tgggttgggt gtagttgttc gtggttgtaa ttttagtatt ttgggaggtt gaggcgggag 420
gattatttga ggttgggagt ttaagattag ttttattaac gtggagaaat tttgttttta 480
ttaaaaatat aaaaaattag ttggttatgg tggtatatgt ttgtaatttt agttgttcgg 540
gaggttgagg taggagaatt atttgaatta gggaggtaga ggttgtggtg agtagagatc 600
gcgttattgt tttttagttt gggtaataag agtaaaagtt cgtttaaaaa aaaaaaaaag 660
ttttttcgat gtgattgttt ttttttaaat ttgtagattt ttttaagatt atgtttttta 720
gatattttaa agattttaga agatatgttt cggggggtttt ggaagttata aggtaaatat 780
aatatatttt tttttttgat tattaatttt attagaggat gtggtgggaa aattattatt 840
tgatattaaa ataaataggt ttgggatgga gtaggatgta agttttttag gaaagtttaa 900
gataaaattt gagatttaaa agggtgttaa gagtggtagt ttagggaatt tatttcggat 960
ttcgggggag ggggtagagt tattagtttt tgtatttagg gatttttcga ggaaaagtgt 1020
gagaacggtt gtaggtaatt taggcgtttc ggcgttagga gggacgtatt taggtttgcg 1080
cgaagagagg gagaaagtga agttgggagt tgttattttt agatttgttg gaatgtagtt 1140
ggagggggcg agttgggagc gcgtttgttt ttaattatag gagaaggagg aggtggagga 1200
ggagggttgt ttgaggaagt ataagaatga agttgtgaag ttgagatttt tttttattgg 1260
gatcggagaa attaggggag tttttcgggt agtcgcgcgt ttttttttac ggggtttttt 1320

attgcgtcgc gcgttcggtt tttattttc gtagtatttc gcgtttcgcg tttttttagt 1380
cgggtttagt cggagttatg gggtcggagt cgtagtgagt attatggagt tggcggtttt 1440
gtgtcgttgg gggttttttt tcgtttttt gttttcgga gtcgcgagta tttaaggtgg 1500
gtttggtgtg gggaggggac ggagtagcgg cgggatttg ttttgtggat gtttcgtcga 1560
ggtttcgcgg tcggcggggt tagaggggtt cggacgagtt tttttatttc gaagttgtgg 1620
atagtcgaga cgtttagggt agtcgggttt tggggttttc gggcgggagg gggtagttat 1680
acggtagcgg ttcgagatgg tttatttaag agattggcgt tttttaggt 1729

<210> 49
<211> 1729
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 49

gtttggaaag cgttagtttt ttggatgggt tatttcgagt cgttgtcgtg taattgtttt 60
ttttcgttcg agggttttag ggttcggttg ttttgagcgt ttcgattgtt tataatttcg 120
ggataggaga gttcgttcgg gttttttgg tttcgtcggt cgcgggattt cggcggggta 180
tttatagggt agggtttcgt cgttgtttcg tttttttttt atattagatt tattttgggt 240
gttcgcggtt tcggggggta agaggcgag gaggagtttt tagcggtata aggtcgttag 300
ttttatggtg tttattgcgg tttcggtttt atggtttcgg ttggattcgg ttgggagggc 360
gcggggcgcg gggtgttgcg aggggtgggg gtcgggcgcg cggcgtagta aagggtttcg 420
tgggaagggg cgcgcggttg ttcgggggt tttttggtt ttttcggttt taatggaggg 480
gaatttagt tttataattt tatttttata ttttttaag tagtttttt tttttatttt 540
tttttttttt tgtgattggg agtaagcgcg tttttagttc gttttttta attgtatttt 600
aataagtttg ggagtggtaa tttttagttt tattttttt ttttttcgc gtaggtttgg 660
gtgcgttttt tttagcgtcg ggacgtttgg gttgtttgta gtcgttttta tattttttt 720
cggagaattt ttaaatgtag aggttggtga ttttgttttt tttttcggag ttcgggataa 780
atttttagg ttgttatttt taatattttt ttaagtttta ggttttattt taaattttt 840
tggggagttt gtattttatt ttattttaag tttatttgtt ttaatattaa ataatggttt 900
ttttattata ttttttagta aaattgatag ttaaggaggg ggatgtgttg tgtttatttt 960
gtggttttta ggattttcgg ggtatatttt ttggaatttt tgaagtattt gaaaagtatg 1020
attttaagag ggtttataaa tttgggagga gatagttata tcgaaaggat ttttttttt 1080
ttttaaacga atttttgttt ttgttgttta ggttggagag taatggcgcg atttttgttt 1140
attataattt ttgtttttt ggtttaagtg atttttttgt tttagtttt cgagtagttg 1200
ggattatagg tatgtgttat tatgattagt taattttttg tatttttagt aaagataggg 1260
tttttttacg ttggtgaggt tggttttgaa tttttaattt taggtgattt tttcgtttta 1320
gtttttaaa gtgttggaat tataattacg agtaattgta tttagtttaa aaagattttt 1380
attttaattt tttaaaatgt atttttttg tttatttaag gaggtattta gtatttaatg 1440
tatttaaggt tttttttttg ttttttgttt tttattagtt tgtttaattt tattttttaa 1500
ttatatttta tttggagttt ttgattttat tttttaggtt tagtggtagg ggtggggatg 1560
gaaggaagat tttttttttt ttttttaatt ttaataagat attgtatggg atatatttat 1620
attaataaat tatttattgt ttatttgaaa tttaaattta attgggtttt tttattttta 1680
tgtgttaaat ttggtagttt tagttggaat gttttagtta agaatgtag 1729

<210> 50
<211> 12963
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 50

gttaggagtt ttagaaatag gggagagtta gaaagttggt tagatttatg ttttttaagt 60
gtagggttag ggttgagttt gtttttgggg taggtaagtt tttttgaatt tttgagggaa 120
gtagaagata taaattgtta gataaaatgt aagtttagtt taaaagggtt acgtgtcgtt 180
ttttttagtt ttggggtatt ttttttttag aaaattggat tgttttatag tgaaaatttc 240
gggggtggtt agttttttgt ttcgttgtta tttttattat ttatagtttt ttaagaagtt 300

tttaggttgg gtgttgaatt ttgattagga attattgaga aatcgaggta gttgggagaa 360
gttgtagttt taagcgttga aaggaagatg gggataata aatttgggtc gttaagtaaa 420
gggggtagag gtttggagaa gtgggtttta ggattagagg atagatcgat tttatatttt 480
atttttttag attttatatt ttattgttat tattatttac gtgtttttttt cgtttttttgt 540
agcgggtttt ttagaggtat tttttatggt ttttttagat tttaattttg gttcgttcgt 600
ttttttttta gaaaggtttt cgtttgtttt ttttgtagga aggtttgtat ttttagaaag 660
tttttgtttt tcgattcgag gatttaattt attaggggaa ttaaattttg tttttagggg 720
agtggagaga gaaattgggt ttttttttcg tagtttttgg gatatagttg agttagttat 780
aggatttggg gataatcggg gcggattttt tttttcggga ggcggtggta ttagtttaga 840
gttcgtattt ttatttatcg gggaagcgtg gggagaagga tgggttggag ttgggttttg 900
gtttgaagga tagtagttcg gagttaacgg ttgagttttt aaagttttta tattgtagag 960
gaagtatagc ggagattagt tttagttagg atggtttcga agtttttagg gattcgacgt 1020
agagttaaag aaatttattt gtgttttttt tttttttttgg gagtaggtag aagattttcg 1080
ggaggagagg cgaatagcgg acgttaattt ttttgaaagt attgtgtttt ttagtatcgc 1140
gggtcgttac gggtttttttg ttgtcgcggg atttcggttt atttttcgat tgggtcgtcg 1200
tatttcggat tagatttcgc gggcgattta cggaattcgc ggagtcggga cgtgaaaggt 1260
tagaaggttt ttcgttttta ttaagtttta gggtttttcg tggttgttgg gagttgtagt 1320
ttgaacgttt ttattttggc gagaagcgtt tacgtttttt ttatcgagtt tcgcggtaat 1380
ttttaaagta tttgtatcgt tttttcgtcg tttgtagagg gcgtagtagg ttttgtattt 1440
tttttgtatt ttatttttta ggttttagat ttgttttttt tatttaaaaa atatttatta 1500
tcgagttttt atttgttatt tagtattgat ataggtattt aggaatataa taatgaataa 1560
gatagtagaa aaattttata tttttataag gtttacgttt ttatgtattg aaagtaatga 1620
ataaataaat tttattagag tgataagggt tgtgaaggag attaaataag atggtgtgat 1680
ataaagtatt tgggagaaaa cgttagggtg tgatattacg gaaagttttt ttaaaaaatg 1740
atattttaat tgatgagaag aaaggattta gttgagagta aacgtaaaag tttttttttt 1800
tttatttttt atatttgata taatgtagga ttttttttaaa atgattttta ttaattttgt 1860
ttttatagtt ttggtttgta gaattttttta ttttaaaatg ttagtattta cggtattagg 1920
tcggcgagaa ttttgatttt gtattttttt ttttaatttt attttttttg tttttttcgg 1980
taggcggatt atttgttttt atttgttatg gcgattgttt agttttgtgt taggagtttc 2040
gtaggggttg atgggattgg ggtttttttt ttttatgtgt ttaagattgg cgttaaaagt 2100
tttgagtttt ttaaaagttt agagttatcg tttagggagt aggtagttgt tgggtttcgg 2160
ggatatttttg cgttcgggtt gggagcgtgt tttttacgac ggtgatacgt tttttttggat 2220
tgggtaagtt tttgattgaa tttgatgagt ttttttttgag ttacgggttt tcggtttcgt 2280
gtatttttag ttcgggaaaa tcgttggggt tgggggtggg gtagtgggga tttagcgagt 2340
ttgggggtga gtgggatgga agtttggtta gagggattat tataggagtt gtattgttgg 2400
gagatttggg tgtagatgat ggggatgtta ggattattcg aatttaaagt tgaacgttta 2460
ggtagaggag tggagttttg gggaattttg agtcggttta aagcgtattt ttttgtatat 2520
ttattcggtg ttgggcgtag ggaatttttg aaataaaaga tgtataaagt attgaggttt 2580
gagattttttg gatttcgaaa tattgagaat ttatagttgt atattttaga gtttatggta 2640
ttttagtgaa aattggggtt ttatttcgaa atgattattt gggggtgatt cggggagttt 2700
aagttgttaa ggttttataa ttttcggatt tttgtttttt ttggagcgat tttttttaggt 2760
agttttcggt ttcgttagat ggagaaaatt taattgaagg ttgttagtcg tggaagtgag 2820
aagtgttaaa ttaggggttt gttcgttagg tcgaggagga tcgtcgtaat ttgagaggtt 2880
cggtagtttt gttattgttt ggttttatat ttatattttt gtttttttgta gtagtatttt 2940
cggttttttt ttgtcggagt agtttattat ttattcgatg agaggggagg agagagagag 3000
aaaatgtttt ttaggtcggt ttttttttatt tggtagaggg aggttgttat ttttcgtttg 3060
tattttttttt tttggattat ttagttatgg tttttgtaaa ggtaggggta tttgttttga 3120
tgtaaatttt aattttttttt ttttttttgaa tggtgtgttt tatttttcgg gtcgtttgta 3180
atttaggcgg acgttattat ggcgtagata gggagggaaa gaagtgtgta gaaggtaagt 3240
tcggaggtat ttttaagaat gagtatattt tatttttttcg gagaaaaaaa aaaaagaatg 3300
gtacgtttga gaatgaaatt ttgaaagagt gtaatgatgg gtcgtttgat aatttgtcgg 3360
gaaaaataat ttatttgtta tttagttttg ggttaggtta ttttagtttt agacgtaggt 3420
tgaacgtcgt gaagcggaag gggcgggttc gtaggcgttc gtgtggtttt tcgtgtagtt 3480
ttcggttcga gtcggttttt tttggtagga ggcggaattc gaatttattt ttttcgttgt 3540
tttatttttt agttcgcggt tgttttattt cgtagttttt ttttatgtat ttgtcgcgta 3600
tcggttattt tgtgtcgtat ttacgttatt ttttttttaa atcgaggtgg tatttatata 3660
tagcgttagt gtatatagta agtgtatagg aagatgagtt ttggttttta atcgtttcgt 3720
gatgtttatt aagttataga ttttttttat cgttttagaa acgttttatt acgttttttt 3780
ttagtcgatt ttcgatttta tttttatttt gatttttata attattttgt ttgttggaga 3840
attttatata gaatggaatt aggatgggcg ttgtggttta cgtttgtatt ttggtttacg 3900
tttgtatttt gggaggtcga ggcgggcgga ttatttgagg ataggagttt tagattagcg 3960
tggttaacgt ggtgaatttt cgtttttatt aaaaaatata aaaattagtt gggcgtggtg 4020
ggtgtttgta atttagtta ttcgggaggg tgaggtagga gaatcgtttg aattcgggag 4080

gtagaggttg tagtgagtta agatcgtgtt attatatttt agtttgggcg ataagaacga 4140
aatttcgttt taaaaaaaag gggggaatta tatattatgt gtttattttt gtcgggtttt 4200
tgttttttaa tgtattgttt gatattcgtt tatgttgtat atattagtat tttgtttttt 4260
tttatttagt atagtttatc gattgtatat tcgttttttt gatggttttt tgagttgttt 4320
tttatttgcg gttatgaaat aaagttgtta taaatatttt tgtataattt tttttgtgat 4380
tatatgtttt cgtgtttttt ggagaaatat ttaggagggg aattgtggag gaagtaaaaa 4440
gtagttgtat tttgaatttt tttagaagtt ttgagttttt tagagcggtt gtattatttt 4500
atattttaat tagtaaggta tgggagttat tatggttgtg ttatagtttt tcggatatta 4560
ggtatgttag tttttttaat gtggtatatt tttgtggttg taatttatag tttttttattg 4620
attaaggatg tttagtattt ttttatgtgt ttattggtta ttcgtatttt gtttgtaaag 4680
tagttttcg agtttttttat ttgttatttt ggtttttttg tttgttttta ttgtttagtt 4740
gtgggattgt tttatatttt ttggatataa gtttttatta gatttatgag tcgtgaatgt 4800
ttttttttga tttgttgcgg gtttatttgt ttgttttata gagtttatag aattttaaga 4860
ggagtggatt aattttttttt atgtttagta tttgttttgt tttgtttagg atattttttt 4920
ttttttttt aattttaggg ttatgaagat ataattttat atttttttt aggattttta 4980
tggtggtaag ttttatagta aggtttttaa gttattaatt aatttttaaa attaattgtt 5040
tatggtgtga ggtgtaggag ttagtttttg gtattttttt tgtatggaaa tttagttatt 5100
ttgtttttat ttgttgaaat aggttttttt tttttattga atgtttttaa ttttaattat 5160
tttatagttg gagtataggg ttattatttt agtgttattt tttttttttt tttgttaatt 5220
tttgagatag ggatttatat tgttgtttag gttagagtat aatggtataa ttaaggttta 5280
ttgtagtttc gaatttttgg gtttaagtag ttttttagta gttttacgag tagttgggat 5340
tattttatta tatttagtta attattttat ttttttgtat tgataggatt ttattatgtt 5400
gtttaggttg gttttaaatt gttggtttta agtttttatt ttatttcggt tttttaaagt 5460
gttgggatta taggtgtgag ttattatgtt tgatttttta gtgttatttt ttatttattt 5520
tttttgtttt ttgttttttt taaacgttgg aggaagaaat agtatttatt ttatataaat 5580
tttttagaaa atagaggaat agattgggcg cggtggttta tatttgtaat tttagtattt 5640
tggtacgttg aggtagggga ttatttgagg tcgggagttc gagattagtt tggttaatac 5700
ggcgaaattt tatttttatt aaaatataaa agtagttagg cgtgtattat atttgtaatg 5760
ttagttattt aggaggttga ggtataagaa tttttttgaat ttgggaagcg gaggttgtag 5820
tgagtcgaga ttgcgttatt gtattttagt ttgggtaata gagtgagatt ttgttttaga 5880
aaaaaaaaga aagaaagaaa aaatagagga atattttttta atttgtttc gaagttagga 5940
taattttggt attaaaatta aataaggata ttataagaaa agaaaatata gattaatatt 6000
tttgttagta tagatatgta atagttaatt aattttagta aattaaattt ggtaatatag 6060
aaaaaaggat aaataggtta gtcgcggtgg tttacgtttg taattttagt attttgggag 6120
gttgaggtag gtagattatt tgaggttagg agtttgagat tagtttgatt aatatggtga 6180
aatttcgttt ttaataaaaa tataaaaatt aggttgggta cggtggttta cgtttgtaat 6240
tttagtattt tgggaggtcg aggtgggtag attacgaggt taggagttta agattagttt 6300
gattaatgtg gtgaaacgtt atttttatta aaaatacgaa aattagtcgg tgtggtggta 6360
tttgtttgta attttagtta tttaggaggt tgaggtagaa ttgtttgaat tcgggaggta 6420
gaggttgtag tgagttaaga tcgtgttatt gtattttagt ttgggcgata gagtaagatt 6480
ttattttaaa aaaaaaaaaa attagttggg tatggtggtg ggtatttgaa attttagtta 6540
ttcgggagtt tgaggtagga gaatcgtttg aatttaggag gtagaagttg tattgagttg 6600
ggattatatt attgtatttt agtttgggta atagagtgag attttatttt aaaaaaagaa 6660
aaagaaaaag gataaatata ttttaattaa ataatgttta ttttatgatt gtagttgatt 6720
taatatttaa aaattggttt ggtgtagtag tttaggtttg taattttaat attttaggag 6780
gttgaggtag gaagattttt tgagtttagg attttaagat tagtttgggt aatatagtta 6840
gattggtttt tattgggggg aaaaaaatta gtttgtgtaa tttattatat taataaaggg 6900
aaatataaaa atttatgat tattttaata gatgtagtaa aagtagttaa tgatattaat 6960
atatatgtat gattataaat taattaattt tttagtaaat tagggaaagg aaatttaatt 7020
agtttgataa tagggcgttt atagtcggag ttttattagt agtatatata atggtagaaa 7080
atttagtgtt gttgggggcg gtggtttacg tttgtaatgt tagcgttttg ggaggtttag 7140
gcgggcggat tacgaggtta ggagatcgag attgttttga ttagtatgtt gaaatttcgt 7200
ttttattaaa aatataaaaa taaaaaatta gtcgggtatg gtggcgggcg tttatagtgt 7260
tagttattcg ggaggttgag gcgagagaat ggcgtgaatt cgggaggcgg agtttgtaga 7320
gtttagatcg tgttattgta ttttagtttg ggtgatagag tgagatttcg ttttaaaaaa 7380
aaaaaaaaaa aaaaaagaaa agaaaattta acgttttttt ttttaagatt aggaattaga 7440
aaaggatttg atttttataa cgttgatatt atattggagg ttttaattag gtaagaaaaa 7500
gaaataatga gggtcgggtg cggtggttta ggtttgtaat tttagtattt tgggaagtcg 7560
agacgggtgg attacgaggt taggagatcg agttattttg gttaatacgg tgaaattttg 7620
tttttattaa atatataaaa aattagtcgg gcgtggtggc gggcgtttgt agttttagtt 7680
attcgggagg ttgaggtagg agaatggcgt gaatttaggg ggcggagttt gtagtgagtt 7740
gagatcgagt tattgtattt tagtttgggc gatagagtaa gattgtgttt taaaaaaaaa 7800
aaaagaaaaa gaaataatga ttagtggttc gatgttttac gttagtaatt ttagtatttt 7860

gggaggtcga ggtgggtaga ttatttgagg tttggagttg gagattagtt tgataaagat 7920
ggtgaaattt cgtttttatt aaaatattaa aaaaatagtt aggcgttggt cgggtatagt 7980
ggtttatgtt tgtaatttta gtattttggg aggtcgaggt gggtggatta tttgaggtta 8040
ggagtttaat attagtttgg ttaatatggt gaaattttat ttttattaaa aatataaaat 8100
tagtcgggcg tagtggcggg cgtttgtaat tttagttatt tgggaggttt aggtaggaga 8160
atcgtttgaa tttgggaggc ggaggttgta gtgagtcgag attgtattat tgtattttag 8220
tttgggtgat aaaagtaaaa atttcgtttt aaaaaaaaaa gaattagtta ggggtagtgg 8280
tgaacgtttg tagttttagt tatttaggag gtagaggtag gagaattatt tgaatttcgg 8340
aggtagaggt tgtagtgagt cgagattgtt ttattgtatt ttagtttagg cgagaagagt 8400
aaaattttat gttaaaaaaa aaaaaaaaaa aggaaagaaa aaaaataacg attagaaagg 8460
aagaaattaa atatatttat agttagtatg attttatata tattatggtt ttaatggggt 8520
taggcgtggt ggtttatgtt gtaattttag tatttttagg aggttgaggt aggtggtttt 8580
tttgggatta gttggttaat atggtgaaat tttaatttta ataaaaatat aaaaaattag 8640
ttaggcgtgg tgagggtatt tttaatttta gttatttagg aggttgaggt aggagaattg 8700
tttggatttg ggaggtagag gttgtagtga gtcgagatcg cgttattgta ttttagtttg 8760
ggtaataaga gtgaaatttc ggtagggtgt ggttttacgt ttgtaatttt agtatttcgg 8820
gaggttgagt taggtcgatt atttgaggtt aggagtttga gattaattta atatggtgaa 8880
atttcgtttt tattaaaaat ataagaatta gttgggtgta gtggtgggcg tttgtaattt 8940
tagttatttg ggaggttgag atagaagaat tgtttgaatt taggaggtgg aggttgtagt 9000
gagttgagat tatgttattg tatattacgt cgggtaatag agcgagattt cgttttaaaa 9060
aaaaaaaaaa gatgaaattt tattttaaaa aaaaaaaaaa gttttaatgg aaaatttata 9120
aaaagttatt aaaattaata aataaatata gtagggttgt aggttatagg gtaatatagt 9180
tattttttta tttgtagggg tttggttttg ggattttta tatattaaat ttatagatgt 9240
ttaagtttta tatataagac ggaatagtat ttaatttata tatatttttt tatatagttt 9300
aaattattta gattatttat attattttta tataatgaaa atgttaatgt atatgtaagt 9360
atgtatgtaa gtatttgtat tatattgttt agggaattat tggatagata ggtttttaag 9420
attgatatta gtagttattg ttaagatttt ggttaggttt gtttttgttt ggggttttag 9480
ttgattttat tgttttttta tttagttaag ggtatttgta tttttttttgg tttttggtt 9540
atttggaagg tttagtttag tttggtatat ttgtattttg gtttattgat gttggtattt 9600
ttgggaaggt tttgttttga aaaatacgga gattttagtt gttattgaag atttgagaga 9660
taaagatagg gagatttgtt tgtagatttg tgttttttta agtgggattg agattttggg 9720
tttttattt taggatagta tttttggtt tgttgattga atagattttt gaaggaggtg 9780
tagttgtatt ttaggagtgg gggtgggagt agtattattg attcgtatta ataattatat 9840
agttttttt agaataataa tatagaataa gtgaaataga ataattgtag aaagagttaa 9900
tttttgttga gtttttattg tgtgtttagt attttttta attttatatt ttttataata 9960
tatagagtat taggtaggcg gggtttgggg gtttacgttt gtaattttag tattttagga 10020
ggttaagggg ggtggattat ttgaggtcgg gagtttaaga ttagtttgat taatatggtg 10080
aaatttcgtt tttattagaa gtataaaatt agttaggtgt ggtggtatat gtttgtagtt 10140
ttagttattt agtaggttga ggtaggagaa ttatttgaat tcgggaggag gttgtagtaa 10200
gcggagatag tgttattgta ttttagtttg ggtaataaga gttgagattt cgttttaaaa 10260
taaaataaaa taaaataaaa taaaataaaa taaaataaaa aaagaaaaga gtttgttatt 10320
aaaggagttg tttggtaggg gatgttttgt tagtgtaaat aatagaaaag tgggttgggt 10380
atagtggttt atgtttgtaa ttttagtatt ttgggaggtt aaggcgggcg gattatttga 10440
agttgggagt ttaagattag tttgattaat atggagaaat ttcgttttta ttaaaaatat 10500
aaaattagtc gggcgtagtg gtcgatgttt gtaattttag ttattcggga ggttgaggta 10560
ggagaatcgt ttgaatttgg gaggtagagg ttgcggtgag tcgagatcgt attattgtat 10620
tttagtttgg acgagagtaa aattttgttt taaaaaaaaa aaaaaataga aaagtgtaat 10680
aaatatttat agtaggtatg tttttagta aatttgatga taaatttggt ataaagaaag 10740
agagtatttt tgaaaaaaaa aaaaagaaaa agaaagagag tattttgttt gggtaatata 10800
gtgaaatttt gtttttataa aaaaatttaa aaattggtcg ggtgtagtgg tttatatttg 10860
taattttagt attttgggag tcggaggcgg gaggattatt tgaggttagg agttcgaaat 10920
tagtttggtt aatatggtaa aattttattt ttattaaaaa tataaaaaat taattaggcg 10980
tattggtggg cgtttgtaat tttagttatt taggaagttg aggtaagagg atcgtttgat 11040
attgggaggt ggaggttata gtgagtcgag attatattat tgtattttag tttgggtgat 11100
agggcgagat ttcgttttta aaaaaaaaaa gaaaaagaaa aagattaaaa aattagttag 11160
gtaggttttt gtggttttag ttatttggga ggttgaggta ggagaattat tgagtttagg 11220
agtggtaggt tgtagtgagt tatgattgta ttattgtatt ttagtttggg ttttaaagta 11280
agattttgtt ttaaaagaaa aaagaaagaa agaaagaata tggcgggtta ggtatagtgg 11340
tttatatttg taattttagc gttttgagag gtcgaggtag gtggattata aggttaggag 11400
ttttatatta gtttggttaa tatggtgaaa ttttgttttt attaaaaata taaaaaatta 11460
gtaggtaggg tggtaggggt ttgtaatttt agttattcgg gaggttgagg taggagaatt 11520
gtttgaaatt agaaggtaga ggttgtagtg agtttagatt gtattattgt attttagttt 11580
gggcgaaaag agttaaattt tattttaaaa aataaataaa aaaataaaat aaaaaaaaat 11640

atggtagttt ttgaaagttt gtttgggaga aggtgcgatg atggttgtat aatttcgtgt 11700
aagatgttgg tttatatagg ggttgttttt tgtttttttt cgttttttta atttttttata 11760
taataggttt gtgtgttatg tatatttatt gagtttaagt aggtgtaagg tattgtgatt 11820
taatattttg gttagtaaga taataagata gattattgtt ttgtttttag gaagtgtata 11880
tgttattaga ggaaatagat aaaataaata aggaaaagta ttagataatg taagtgttat 11940
gagaatgtaa atgaggtgat gtgaattaaa ataggatgat ttaagtttgt acggaaggtt 12000
tttattttta tgtttttggt tagttaagga attattagtt gattagtaga gaagggtagt 12060
tcgtttagtt agagtttttg gggaagaggg agtggttgtt aagagatgag attaaagaag 12120
tcgagacggg tttttcgtga ggggggggttg taatgtaggg ttgaggagtg ttcgaagaga 12180
atgggtaggt gagcggtgag atagttgttt ttttagaagt tttgtagtga aaggaattaa 12240
agaaatggag tcgtgtatta ggtggggaag ggtgggggtt aagggggtgt ttttttttat 12300
atagagattg taggttgaga atgattatat ttttgttaat aggaggtggg agtagggtac 12360
ggtagtttat atttgtaatt ttggtatttt aggaggcgga ggcgggtcga ttatttgaag 12420
taaggagttc gagattagtt tggttaatat gtaaagtttt gtttttatta aaaatataaa 12480
aattagttgg gtgtggtggt attcgtttgt aattttagtt attcgggaga ttgaggtagg 12540
agaatggttt gaattcggaa ggtagaggtt gtagtgagtt gagattatgt tattgtgttt 12600
tagtttaggt gatagagaga gattttattt taaaaaaaaa aaaaaatata ggaagggagt 12660
tgggaatagg gtgtatattt aggaagtttt ggggatttag tggtgggaag gttggaagtt 12720
tttttttgat tgtttttttt ttaaagaagt gtatggttgg tgtggggtgg ggtaggagtg 12780
tttgggttgt ggtgaaatat tggaagagag aatgtgaagt agttattttt tttttgtttt 12840
ataggaagtc gagttgtttt agatattggt atggtgttgg gggagggggt ttttttttttg 12900
taggtttagg tgatttaggg ttggaagtgt tttatgttgg atttttattt ttttttttgt 12960
agt 12963

<210> 51
<211> 12963
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 51

gttgtaagag gaaaagtggg gatttagtat gagatatttt taattttggg ttatttgggt 60
ttgtagagaa ggaatttttt tttttaatat tatgttagtg tttgagatag ttcggttttt 120
tgtggagtag gaaaagaatg gttgttttat attttttttt ttaatgtttt attataattt 180
aagtattttt gttttatttt atattagtta tgtatttttt tgaggaaaag ataattagag 240
agggattttt aattttttta ttattaaatt tttaagattt tttaaatgtg tattttattt 300
ttaatttttt ttttgtattt tttttttttt ttgagatgga gttttttttt gttatttagg 360
ttggagtata gtggtatgat tttagtttat tgtaattttt attttcgggg tttaagttat 420
tttttgtttt tagtttttcg agtagttggg attataggcg agtattatta tatttagtta 480
atttttgtat ttttagtaga gatagggttt tgtatgttgg ttaggttggt ttcgaatttt 540
ttattttagg tgatcggttc gttttcgttt tttaaagtgt taagattata ggtgtgagtt 600
atcgtgtttt gtttttattt tttgttaata aggatatagt tatttttagt ttgtaatttt 660
tgtatgggga aggatatttt tttggttttt attttttttt atttgatata cggttttatt 720
tttttgattt tttttattgt aaagttttttg gaagaataat tgttttatcg tttatttgtt 780
tatttttttc ggatattttt tagttttgta ttataatttt tttttacgaa gggttcgttt 840
cggttttttt aattttattt tttaataatt attttttttt ttttaaaagt tttagttaga 900
cgggttgttt ttttttgtta attaattggt ggtttttttgg ttagttagga atatgggggt 960
aggggttttt cgtgtagatt taagttattt tattttaatt tatattattt tatttgtatt 1020
tttatagtat ttatattgtt tgatattttt ttttgtttat tttatttgtt ttttttaata 1080
gtatatatat tttttaaggg tagggtagtg atttattttg ttgttttgtt gattaaagta 1140
ttagattata atgttttgta tttgtttggg tttaataaat gtgtataata tataagtttg 1200
ttatatgaga ggttaagaga gcgagaaaga gtaaggggta gtttttgtgt ggattagtat 1260
tttgtacgaa gttatgtaat tattatcgta ttttttttta gataagtttt taaaggttgt 1320
tatgtttttt tttgttttgt tttttttgttt gtttttttgag atggagtttg gtttttttcg 1380
tttaggttgg agtgtagtgg tgtagtttag gtttattgta atttttgttt tttggtttta 1440
agtaattttt ttgttttagt ttttcgagta gttgggatta taggttttta ttattttgtt 1500
tgttgatttt ttgtattttt agtagagata gggttttatt atgttggtta ggttggtgtg 1560
gaatttttga ttttgtgatt tatttgtttc ggttttttaa agcgttggga ttataggtgt 1620
gagttattgt gtttggttcg ttatgttttt tttttttttt tttttttttt tgaggtaggg 1680
ttttgttttg aagtttaagt tagggtatag tggtgtaatt atggtttatt atagtttgtt 1740

atttttgggt ttagtgattt ttttgtttta gtttttaag tagttgggat tatagaggtt 1800
tgtttggtta attttttagt ttttttttt ttttttttt ttttggagac ggagtttcgt 1860
tttgttattt aggttagagt gtagtggtgt gatttcgatt tattgtaatt tttattttt 1920
agtattaagc gattttttg ttttaatttt ttgagtagtt gggattatag gcgtttatta 1980
atgcgtttga ttaattttt gtatttttag tagagatggg gttttgttat gttggttagg 2040
ttggtttcga atttttgatt ttaggtgatt ttttcgtttt cgatttttaa agtgttggga 2100
ttataggtgt gagttattgt attcggttaa tttttgagtt tttttgtaga ggtagggttt 2160
tattatgttg tttaggtagg atgttttttt ttttttttt ttttttttt ttagggatgt 2220
ttttttttt tatgttaaat ttgttattag atttgttaag aaatatgttt attgtaagtg 2280
tttgttatat tttttgttt ttttttttt ttgagataga gttttgtttt cgtttaggtt 2340
ggagtgtaat ggtgcgattt cggtttatcg taatttttgt tttttaggtt taagcgattt 2400
ttttgtttta gtttttcgag tagttgggat tataggtatc ggttattgcg ttcggttaat 2460
tttgtatttt tagtagagac ggggtttttt tatattggtt aggttggttt tgaattttta 2520
attttaggtg attcgttcgt tttggtttt taaagtgttg ggattatagg tatgaattat 2580
tgtgtttagt ttatttttt gttgtttgta ttgataaaat atttttatt aaatagtttt 2640
tttaatggta ggttttttt tttttttatt ttattttatt ttattttatt ttattttatt 2700
ttattttgag acggagtttt agtttttatt gtttaggttg gagtatagtg gtattatttt 2760
cgtttattgt aatttttttt cggatttaaa tgattttttt gttttagttt gttgagtagt 2820
taggattata agtatgtgtt attatatttg gttaattttg tatttttagt agagacgggg 2880
ttttattatg ttagttaggt tggttttgaa ttttcgattt taggtgattt atttttttg 2940
gtttttaaa gtgttgggat tataggcgtg agtttttaag tttcgtttat ttagtatttt 3000
atgtattatg ggaaatgtag agttgaggaa agtgttgggt atatagtaag agtttaataa 3060
aggttagttt tttttgtaat tgttttattt tatttgtttt atattattat tttagagaga 3120
attgtgtgat tgttagtgcg gattagtggt attgtttta tttttatttt taaaatgtaa 3180
ttatattttt tttagggatt tatttagtta ataggttagg aggtgttgtt ttgaaatggg 3240
gggtttaaag ttttaatttt atttggaggg atataggttt atagataggt ttttttgttt 3300
ttatttttta aattttagt agtaattaaa atttcgtgt tttttagagt aggatttttt 3360
taggggtatt agtattagtg ggttaggata taaatgtgtt aggttgaatt aggtttttta 3420
aatggttagg gagttaagag aaatgtaggt gtttttggtt gggtgggaag gtaatgagat 3480
taattgagat tttaaatagg ggtaggtttg attagaattt taatagtggt tgttggtatt 3540
agttttgaag gtttatttgt ttagtgattt tttaaataat atagtataag tatttatata 3600
tatatttgta tgtatattag tatttttatt gtatgggggt aatgtaagta atttagataa 3660
tttaaattat atgggaggat atgtgtaggt taaatattat ttcgttttat atatgggatt 3720
tagatatttg tgggtttggt gtgtgaggag ttttagaatt aagtttttat agatagaggg 3780
ataattatat tgttttgtaa tttgtaattt tgttatattt atttattagt tttggtagtt 3840
ttttatggat tttttattag gatttttttt tttttttgag atagagtttt atttttttt 3900
tttttttgag acggaatttc gttttgttgt tcggcgtggt gtgtaatggt atgattttag 3960
tttattgtaa tttttatttt ttgggtttaa gtaatttttt tgttttagtt ttttaagtag 4020
ttgggattat aggcgtttat tattatattt agttaatttt tgtattttta gtagagacgg 4080
ggtttttatta tgttaggttg gttttaaatt tttgatttta ggtgatcggt ttggtttagt 4140
ttttcgaagt gttgggatta taggcgtaag attatatttt gtcggagttt tatttttgtt 4200
gtttaggttg gagtgtaata gcgcgatttc ggtttattgt aatttttgtt ttttaggttt 4260
aagtaatttt tttgttttag tttttttgagt agttgggatt agaggtgttt ttattacgtt 4320
tggttgattt tttgtatttt tattagagtt ggggttttat tatgttggtt agttggtttt 4380
agggaagtta tttgttttag ttttttaaaa gtgttaggat tatagtatga gttattacgt 4440
ttggttttat taggattatg gtatgtatag aattatattg gttgtgaatg tgtttgattt 4500
ttttttttt aatcgttatt ttttttttt ttttttttt ttttttttt gatatggaat 4560
tttgtttttt tcgtttaggt tggagtgtaa tgggataatt tcggtttatt gtaattttg 4620
ttttcggggt ttaagtgatt tttttgtttt tgttttttga gtagttggga ttataggcgt 4680
ttattattat ttttggttaa ttttttttt tttgagacgg agtttttgtt tttgttattt 4740
aggttggagt gtaatggtgt aatttcggtt tattataatt ttcgtttttt aggtttaagc 4800
gatttttttg tttaagtttt ttaagtagtt gggattatag gcgttcgtta ttacgttcgg 4860
ttaattttgt atttttagta gagatggggt tttattatgt tggttaggtt ggtgttgaat 4920
ttttgatttt aggtgattta tttatttcgg ttttttaaag tgttggggtt ataggtatga 4980
gttattgtat tcggttaacg tttggttatt tttttaatat tttaatagag acgaggtttt 5040
attattttttg ttaggttggt ttttaatttt agatttagg tgatttgttt atttcggttt 5100
tttaaagtgt tgggattatt ggcgtgagat atcgggttat taattattat ttttttttt 5160
ttttttttt ttgagatata gttttgtttt gtcgtttagg ttggagtgta gtggttcgat 5220
tttagtttat tgtaagtttc gtttttttgag tttacgttat ttttttgttt tagtttttcg 5280
agtagttggg attataggcg ttcgttatta cgttcggtta atttttgta tatttagtag 5340
agatagggtt ttatcgtgtt agttaggatg gttcgatttt ttgatttcgt gatttattcg 5400
tttcggtttt ttaaagtgtt gggattatag gtttgagtta tcgtattcgg tttttattat 5460
ttttttttt tgtttggtta aaatttttag tatggtatta acgttgtgag agttaaattt 5520

ttttttagtt tttgatttta gaggaaaaag cgttgagttt tttttttttt tttttttttt 5580
tttttttttg agacgaagtt ttattttgtt atttaggttg gagtgtagtg gtacgattta 5640
ggttttgtaa gtttcgtttt tcgggtttac gttatttttt cgttttagtt tttcgagtag 5700
ttggtattat aggcgttcgt tattatgttc ggttaatttt ttgtttttgt atttttagta 5760
gagacggggt tttagtatgt tagttaggat agtttcgatt ttttgatttc gtgattcgtt 5820
cgtttaggtt ttttaaagcg ttggtattat aggcgtgagt tatcgttttt agtagtattg 5880
agtttttat tattatgtat gttgttagtg gaatttcgat tgtggacgtt ttgttattaa 5940
attagttaag tttttttttt ttagtttgtt aggaggttgg ttggtttgta attatgtata 6000
tgtgttgata ttattaattg tttttgttat atttgttgaa atgattatag ggtttttatg 6060
tttttttttg ttaatgtggt gaattatata gattgatttt tttttttta gtaaagatta 6120
gtttgattat gttgtttagg ttggttttga aattttgggt ttaagagatt tttttgtttt 6180
agttttttaa aatgttggga ttataggttt gagttattgt attaggttaa tttttgaatg 6240
ttgaattagt tataattatg agataaatat tatttggtta gaatgtattt attttttttt 6300
tttttttttt tttgagatgg agttttattt tgttgtttag gttggagtgt aatggtgtga 6360
ttttagttta gtgtaatttt tgtttttttgg gtttaagcga ttttttttgtt ttagattttc 6420
gagtagttgg gattttaggt gtttattatt atgtttagtt aatttttttt tttttgaga 6480
tgaagttttg ttttgtcgtt taggttggag tgtagtggta cgattttggt ttattgtaat 6540
ttttgttttt cgggtttaag taattttgtt ttagtttttt gagtagttgg gattataggt 6600
aggtgttatt atatcggttg atttcgtat ttttagtaga gatggcgttt tattatattg 6660
gttaggttgg ttttgaattt ttgatttcgt gatttgttta tttcggtttt ttaaagtgtt 6720
gggattatag gcgtgagtta tcgtgtttag tttgattttt gtatttttat tagaaacggg 6780
gtttattat gttggttagg ttggttttaa atttttgatt ttaagtgatt tgtttgtttt 6840
agttttttaa agtgttggga ttataggcgt gagttatcgc gattggttta tttattttt 6900
tttttatatt attaggtttg gtttgttaaa attggttagt tgttgtatgt ttatgttaat 6960
aggaatattg gtttatattt tttttttta taatgttttt gtttggtttt ggtattagga 7020
ttattttggt ttcgaaaata agttgggaaa tattttttta tttttttttt tttttttttt 7080
ttttttgaga tagggtttta ttttgttgtt taggttggag tgtagtggcg taatttcggt 7140
ttattgtaat tttcgttttt taggtttaag ggattttttgt gttttagttt tttgagtaat 7200
tggtattata ggtatggtgt acgtttagtt atttttgtat tttagtagag atggggtttc 7260
gtcgtgttgg ttaggttggt ttcgaatttt cgattttaaa tgatttttttg ttttagcgta 7320
ttaaagtgtt gagattatag gtatgagtta tcgcgtttag tttgtttttt tgttttttga 7380
agagtttgtg taagatgggt attgtttttt tttttaacgt ttaaagagag tagagaatag 7440
aggagataaa tagaaaatag tattaagagg ttaggtatgg tggtttatat ttgtaatttt 7500
agtatttgg gaggtcgaga tgggatgaaa gtttgaggtt agtagtttga gattagtttg 7560
ggtaatatag tgagattttg ttaatataaa aaaataaaat agttagttgg gtgtggtgga 7620
gtaattttag ttattcgtga ggttgttaga ggattgtttg agtttagggg ttcgaggttg 7680
tagtaagttt tgattgtgtt attgtatttt agtttgggta atagtgtgag tttttgtttt 7740
aaaaattaat aaagaaaaaa agaaaatagt attaaaatgg tagttttata ttttaattgt 7800
aaaataatta aaattaaaag tatttagtag agaaaggaag tttattttaa taagtggaga 7860
tagaataatt ggattttat ataggaaaga tattagagat tgatttttat attttatatt 7920
ataaataatt aattttaaga attaattaat ggtttaagga ttttattgta aaatttatta 7980
ttataaaggt tttaaaagaa aatgtaagat tatattttta tgattttggg gttaaaaaaa 8040
aaaaaaaaga tgttttaaat aggataaggt aaatattgaa tataaaaaag attaatttat 8100
tttttttaag atttgtaaa ttttgtaaag taaataaata ggttcgtaat agattagaag 8160
aaaatattta cgatttatgg atttgataag gatttgtatt tagaaagtat aaagtagttt 8220
tataattgaa taataaaaat aaataaaaaa attaaaataa taggtaaaag attcgaagag 8280
ttattttata aataaaatac gaatggttaa taggtatatg aaaaaatgtt gaatattttt 8340
agttaataga gaattgtaaa ttataattat aaggatatat tatattagaa agattgatat 8400
atttaatgtt cggaaggttg tggtataatt ataataattt ttatattttg ttagttggag 8460
tgtaaaatgg tataatcgtt ttggaaaatt tagagttttt gaaaaagttt aaaatatagt 8520
tatttttat tttttttata attttttttt taagtatttt tttaagaaat acgaaaatat 8580
atgattataa aaagaattgt ataagaatgt ttatagtagt tttattttat aatcgtaaat 8640
gggaaataat ttaaaaggtt attaaaagga cggatatata atcgatggat tatattaaat 8700
gaaaaggagt aaaatattga tatatataat atgaacgaat gttagatagt atattgaagg 8760
atagaagttc gataaaaatg agtatataat gtatgatttt tttttttttt ttgagacgga 8820
gtttcgtttt tgtcgtttag gttggagtgt agtggtacga ttttggttta ttgtaatttt 8880
tgtttttcgg gtttaagcga tttttttgtt ttattttttc gaatagttgg gattataggt 8940
atttattacg tttagttaat ttttgtattt tttagtagag acggggattt attacgttgg 9000
ttacgttggt ttggaatttt tatttttaag taattcgttc gtttcggttt tttaaagtgt 9060
aggcgtgagt taaagtgtag gcgtgagtta tagcgtttat tttgatttta ttttatatga 9120
agtttttaa taggtaaaat ggttatggag attaaaataa aggtggggtc gggaatcgat 9180
tgggaagaga cgtgatgaaa cgtttttggg acgatgaaaa gggtttgtga tttggtaggt 9240
attacggagc ggttaggggt taaaatttat ttttttgtgt atttgttgtg tgtattggcg 9300

ttgtgtgtaa atgttatttc gatttaggaa aaagatgacg taagtacggt ataaagtggt 9360
cggtacgcgg taggtgtatg ggaagaaatt gcggaatgaa ataatcgcga gttaagagat 9420
ggggtagcgg gagaaatgaa ttcgagtttc gtttttattt aggaagaatc ggttcgggtc 9480
gagggttgta cggaggatta tacggacgtt tgcgggttcg tttttttcgt tttacgacgt 9540
ttagtttgcg tttggaattg gaatggttta gtttaaagtt agataatagg tagattgttt 9600
ttttcgataa attattaaac gatttattat tgtatttttt taaaatttta tttttagacg 9660
tattattttt tttttttttt tttcgggaag atgagatatg tttatttttg aaagtgtttt 9720
cgggtttgtt ttttgtatat tttttttttt ttttgtttac gttatggtag cgttcgttta 9780
ggttgtaggc gattcggggg gtggggtata ttatttaaag aaggggaggg attgaggttt 9840
gtattaaaat aaatattttt gtttttgtaa aggttataat taagtaattt agaaaaagaa 9900
atgtaggcgg agaatagtag tttttttttg ttaagtaaga ggaatcggtt taaaggatat 9960
tttttttttt tttttttttt ttttatcggg tgaatagtga gttgtttcgg taaaaagaaa 10020
tcggaaatgt tgttgtaaga ggtagaaatg taaatgtgga gttaaataat aatagggttg 10080
tcgggttttt tagattgcga cggttttttt cggtttggcg ggtaaatttt tggtttagta 10140
tttttttattt ttacgattga tagtttttaa ttggattttt tttatttagc ggagtcgggg 10200
gttgtttgga aagatcgttt taggaaggat aaaggttcgg aagttgtggg attttagtag 10260
tttgggtttt tcggattatt tttaaatgat tatttcggaa tggagtttta gtttttatta 10320
ggatgttatg ggttttaaaa tatatagtta tgagttttta atgtttcgag atttaaaagt 10380
tttagatttt aatgttttgt gtattttttta ttttagggat tttttacgtt tagtatcggg 10440
tggatgtgta aagaagtacg ttttaggtcg gtttaaggtt ttttaaagtt ttattttttt 10500
gtttaggcgt ttaattttga gttcggatgg ttttaatatt tttattattt atatttaggt 10560
tttttaataa tgtaattttt atgatgattt ttttagttaa gtttttattt tatttatttt 10620
taaattcgtt aagtttttat tgttttattt ttagttttag cgattttttc gagttgaaaa 10680
tatacggagt cgagagttcg tgatttagag aggatttatt aagtttagtt aggagtttat 10740
ttaatttagg gaagcgtgtt atcgtcgtgg aaagtacgtt tttagttcga acgtaaagtg 10800
ttttcggagt ttagtagtta tttgtttttt ggacggtggt tttagatttt tgagaagttt 10860
aaaattttta gcgttagttt tgagtatatg ggaggggaaa attttaattt tattaatttt 10920
tgcgaggttt ttggtataaa gttggatagt cgttatgata agtaagggta agtaattcgt 10980
ttgtcggagg aagtaaagga aatggagttg gggaggaggg tgtagagtta ggattttcgt 11040
cgatttggtg tcgtagatat taatattttg gggtggaaaa ttttgtaagt tagagttgtg 11100
agggtagaat tggtggaaat tattttggag gaattttgta ttgtgttaaa tatgaagggt 11160
ggaaggaaga aagtttttgc gtttgttttt agttggattt ttttttttta ttagttaaaa 11220
tgttattttt taggaaggtt tttcgtaata ttatatttta acgttttttt ttagatattt 11280
tatattatat tattttattt aatttttttt ataattttta ttattttgat aagatttatt 11340
tgtttattgt ttttagtata tggaaacgta agttttatga ggatatagaa tttttttatt 11400
attttattta ttgttgtatt tttgagtgtt tatattagtg ttgggtagta agtaagagtt 11460
cgataataaa tatttttttga atgagggaga taggtttgaa gtttggagaa tgagatgtag 11520
aagaggtgta agatttgttg cgtttttttgt aggcggcggg ggggcggtgt aggtgtttta 11580
agaattatcg cgggattcgg taggggggagc gtaggcgttt ttcgttaaga tagaagcgtt 11640
tagattataa tttttagtag ttacgaggag ttttagggtt tgatgggaac gggaaatttt 11700
ttaatttttt acgtttcggt ttcgcgggtt tcgtgggtcg ttcgcgaaat ttgattcggg 11760
atgcggcggt ttaatcggaa ggtggatcga aatttcgcga tagtaagagg ttcgtagcga 11820
ttcgcggtgt taaggaatat agtgttttta aaagaattgg cgttcgttgt tcgttttttt 11880
tttcgggagt tttttgttta tttttagaag aggagggaag tataggtggg ttttttttagt 11940
tttgcgtcgg atttttgaga atttcgaagt tattttggtt gaggttaatt ttcgttgtgt 12000
ttttttttgta gtatgaagat tttggagatt taatcgttag tttcggattg ttgtttttta 12060
gattaggatt tagttttagt ttattttttt ttttacgttt tttcgatgaa taaaaatgcg 12120
gattttgaat tgatgttatc gtttttcgaa agggggggatt cgtttcggtt gtttttagat 12180
tttgtggttg gtttagttgt gttttaggag ttacgggagg gggatttagt tttttttttt 12240
attttttttgg aaatagagtt tggttttttt agtgagttga gttttcgaat cgaggagtaa 12300
gaatttttttg aaaatataag ttttttttgta gaagaagtaa acgggagttt ttttgaagaa 12360
gaagcgaacg ggttagagtt ggggtttgga aaagttatgg aagatatttt tggggaattc 12420
gttgtagagg acgagggaga tacgtaagtg gtgatggtag tggagtgtgg agtttgggga 12480
gatgaagtgt gaggtcgatt tgttttttttgg ttttgagatt tatttttttta ggtttttgtt 12540
tttttttgttt ggcgatttag gtttattgtt ttttattttt tttttagcgt ttggaattat 12600
agtttttttt agttgtttcg atttttttagt ggtttttggt tagagtttag tatttaattt 12660
gagaattttt tgaaaggttg taagtggtaa ggataataac ggggtaggga gttgattatt 12720
ttcgagattt ttattgtaaa atagtttagt tttttaggag agggatgttt tagagttggg 12780
agaagcggta cgtagttttt ttagattgag tttatatttt atttagtagt ttgtgttttt 12840
tatttttttt aaggatttag gggggtttat ttattttaga ggtaggttta gttttagttt 12900
tatatttgaa aagtataggt ttggttagtt ttttaatttt tttttgtttt tagggttttt 12960
gat 12963

<210> 52
<211> 3500
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 52

tttagaataa atggtagagg ttagtgagtt tagagatggt gatagggtaa tgatttaggg 60
gtagttgttt gaaacgggag taggtgaagt tatagatggg agaagatggt ttaggaagaa 120
aaatttagga atgggtagga gaggagagga ggatataggt tttgtggggt tgtagtttag 180
gatgggatta agtgtgaaga tattttagta ggtgaggtta ggttttatga atagagaagt 240
agtttttatt ttttttgatg tacggatata tagagtgtgt ggtgttgtgt ttttagagtc 300
gggttttttt gttttggttt ttagggagtg agaagtgagg ttgatttgtt tttgtttttt 360
tttgttattt taatatttat tttttttttta tgtttttttt ttttaaatat gatttggatt 420
tatgttttcg tttaaatttt atgttaaatt gtaaatttta atgttggagg tggggttttg 480
tgagaagtga ttggataatg cgggtggatt ttttgttttg atgttgtttt tgtgatagag 540
attttatatg atttggttgt ttaaaagtgt gtagtatttt tttttttttt tttttttttt 600
tttatttatg ttttgttatg taagacgttt ttgttttttt tttatcgttt agaatgattg 660
taagtttttt gaggtttttt taggagtaga agttattatg tttttttgtat aattgtagaa 720
tgatgagcga attaaatttt ttttttttat aaattattta gttttaggta tttttttata 780
gtaatgcgag gatagattaa tataattttt tatttttaga ttttcgtata cgtttagttt 840
tagatattat tgtttttggg agtatgtata gcgtagtttt ttgtcgataa aagtaaagtt 900
ataaaaggtg ataaaaaattt gtatttgggg atatttgatt gtgaaagagg gaggatagta 960
tatttgtagt tatagagatt ggggtttatc gagttgaaat ttggtagtat tttggtataa 1020
tatgtgtatg attcgtgttt aatgtttaga gattagtgtt gagtaaaata gtttggtttg 1080
gggtcgttgt tgtttttatt tttttttttgt ttattagagg gcggtagagt tttttttatt 1140
ttggagtttt tttaggggtt gttgattttt tttagtcggg tttatagttt agtagggttt 1200
atttttattc gggttatttc ggtttacgtt tttttcgttt ttcgagtttt ttatacggat 1260
tttgttagtt tttttttgta gtttatcggt cgtttatttg aggtttgtcg gtcgtttatt 1320
tgaggtttgt cggttgtttt ttgtaggtag tttttgtttt ttatattttt tttttttttcg 1380
ggtttagttg aaagggcgtt ttttagggta gtttttttgtg atttttagga tagtttagtt 1440
ttttataggt ttcgacgttt tttatgttgt tattttatag ttttgttatt attattaatt 1500
ttttagtttt atgaagttta ttgagcgttt gtttttcggt tataggaaaa ttttgtgata 1560
gggattacgt ttgttttgtt ttttgtggaa ttttagggtt tagtttagtg tttgatacgg 1620
aatagatgtt ttataaatat tggttaaatg tgtgggagat ttttaaaaag aagtatatta 1680
ttttcgtgtg gtttttagta gttagagttt gttttatgtg gatatagggg tattggtatt 1740
agtatgggag gaggttagta agtgttcgcg gttgttttag gaatgaggtt ttaattttta 1800
gagttttaga agggaggata gaggtttgta gggaatagat ttttcggttt gattttgtag 1860
tttaatttag agtttagggt tagtttatat tacgtcgatt ttggttagta tttttagggt 1920
agttttagat aaggtcggag gtttttttttt gtttttttagg gggtgatatt gtatatagat 1980
attatttagg aaacggattt ttttggatag gaatttggtt ttgttaagga agtggaggtg 2040
gagtttggtt tttattttttt gttttaatag atttttttga tttttttttat atatttgttt 2100
tgtttttttt tgggttttat gaggattttg ttttgttagg ggtttttgtg taattttaga 2160
tttttttttg gtattattat ggggaaggtg gggtgattat aggatagtta gtttcgtaga 2220
gatagagatt atttaggatt gttagggaga atatggatag gttttgagtc gtagtttagt 2280
taatagatac ggagagggag ggtttttttg gagttttttt taaggatagt agagtttaga 2340
gttatttatt tttttttatt atagtttttt tttttttagga tatataagat attttttttt 2400
ttatatgtag gatttgggga tttttgagat ttttgggttt gggttttttat ttttgggtta 2460
gtggcggggt tggtggtatt ggagatagag ggttggtttt tttttagtta ttatttagtg 2520
agtttttttt tagtttttag agttattttt gttatttttt tgttgggtat tattttatatt 2580
ttttagagtt ttggagagta tggggagatt cgggattttg ttgggttttt ttgttataaa 2640
ggaaaataat ttttttggtg tgatagattt aaggatagaa tatagtagag gttagtattg 2700
gggaagatag gttgtttttt taggggatgg gggtttattt attttgtcga aaagatttgt 2760
ttgaggaatt gaaaatagaa gggaaaaaag aggagggata aaagaggtag aaatgagagg 2820
ggaggggata gaggatattt gaataaagat tatatttatg atttacgtga tgttgagaag 2880
tatttttgtt ttaggaagag atttagggta gagggaggaa ggatagtaga ttagatagtt 2940
atagtagttt tgataaaacg tttttggaat ttaagttttt ttttatagag gaggatagag 3000
tagatagtag agattatgga gttttttttcg gttttttttt atagatggtg tattttttgg 3060
tagaggtttt tgtttatagg tgaagggagg ataatttggg agagggtggg aggagggagt 3120
tggggttttt tgggtaggat agggttgtga gacggataga gggtttttgt tggagtttga 3180

atagggaaga ggatattaga gagggatagg agttatatta gaaaaattaa attgaattgg 3240
aattggaaag gggtaggaaa attttaagag ttttattttt ttagttaatt gttattggtt 3300
attacgtttt taaaaattat aataattgta ttagatgata ttttaaataa aaatataatt 3360
agggtatgaa atattgtttt tattcgttta tcgcggatat tggaaaataa gttttaggtt 3420
gtggagggtt ttgggaattt ttatgaattt atttatagga atttgtagtt tgttttaggt 3480
attggggtgt aattaagatt 3500

<210> 53
<211> 3500
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 53

gattttggtt gtattttagt gtttgggata ggttgtagat ttttgtggat gagtttatga 60
gggtttttag ggttttttat agtttggggt ttattttta atgttcgcgg taggcggatg 120
aggatagtgt tttatgtttt ggttatgttt ttatttaaag tgttatttga tgtagttatt 180
atgattttta aaaacgtagt ggttagtgat aattaattag gaaaatagaa ttttgaggt 240
tttttgttt ttttttaatt ttagtttaat ttgattttt tggtgtgatt tttgtttttt 300
tttgatgttt ttttttttat ttaggtttta ataggagttt tttgttcgtt ttatagtttt 360
gttttattta ggagatttta gtttttttt tttattttt tttaggttgt ttttttttta 420
tttgtgagta ggagttttg ttaggggatg tattatttgt ggggaggggt cgagggagat 480
tttatggttt ttgttgtttg ttttgtttt ttttgtggag aagagtttga gttttaggaa 540
cgtttgtta aggttgttgt gattgtttgg tttgttgttt ttttttttt tgttttgagt 600
ttttttttag ggtaggagta tttttagta ttacgtgggt tatgggtgtg gtttttattt 660
aggtgttttt tgttttttt tttttattt ttgtttttt tgttttttt ttttttttt 720
ttttattttt agtttttag ataaattttt tcggtaaggt ggatggattt ttattttttg 780
ggaggataat ttgtttttt tagtgttgat ttttgttgtg ttttgttttt gggtttgtta 840
tattaggggg attatttttt tttgtgatag agaaatttag tagggtttcg ggtttttta 900
tgtttttag ggttttggga aggtgggatg atgtttaata ggaaggtgat agaggtggtt 960
ttgggggtta gaaaaaggtt tattgggtgg tggttgggga gggattagtt ttttgttttt 1020
agtattatta atttcgttat tgatttaggg atggagattt aggtttagag gttttaggag 1080
tttttagatt ttgtatgtgg agggggaggt gttttgtgtg ttttggaaag agaggattgt 1140
ggtggaggga ggtgggtgat tttgggtttt gttgtttttg gggaaggttt taggggggatt 1200
ttttttttc gtgtttgttg gttgagttgc ggtttagggt ttgtttatgt ttttttgat 1260
agtttgggt ggtttttgtt tttgcgaggt tgattgtttt gtgattattt tatttttttt 1320
atggtggtat taggagggag tttggagttg tatagggatt tttggtagaa tagggttttt 1380
ataggattta gaaaggaata gagtaggtat gtgggagaga ttagaagggt ttgttggagt 1440
aagggatgga aattaggttt tatttttatt tttttagtaa agttaggttt ttgtttaggg 1500
gaattcgttt tttgagtgat gtttgtgtgt aatgttattt tttggagggt aagaggagat 1560
tttcggtttt gtttggaatt gttttaggga tgttgattag ggtcgacgtg gtgtgagttg 1620
attttgaatt ttggattagg ttgtagggtt aggtcggagg atttattttt tgtaggtttt 1680
tgttttttt tttgaagttt tgggggttga ggttttattt ttggggtagt cgcgggtatt 1740
tgttggtttt tttttatgtt ggtgttagtg tttttgtgtt tatatggaat agattttgat 1800
tgttgggggt tatacggagg tgatatgttt tttttagag atttttata tatttaatta 1860
gtatttatgg agtatttgtt tcgtgttagg tattgggttg ggttttggga ttttatagag 1920
agtaggatag acgtggtttt tgttatagag ttttttgta atcgggagat aggcgtttag 1980
tgaattttat gggattgagg agttaatggt aatgataggg ttgtgaggtg atagtatagg 2040
gggcgtcgga gtttgtgaga gattgagttg ttttggagat tatagggagt tgttttggga 2100
gacgtttttt tagttgagtt cggggaagga gggggtgtag gggataggag ttgtttgtag 2160
agggtagtcg ataggtttta agtgggcggt cgataagttt taggtgggcg gtcgataggt 2220
tgtagggagg agttgataga gttcgtgtga ggagttcgga gggcgaggag gacgtgggtc 2280
gaggtgattc gggtgagggt ggattttgtt gggttgtggg ttcggttgag ggaggttagt 2340
agtttttggg gaggttttag ggtgggagga atttgtcgt tttttggtgg ataggaggga 2400
agtggggata gtagcggttt tagattaggt tgttttattt aatattgatt tttagatatt 2460
gaatacgggt tatgtatatg ttatgttaaa gtgttattag gttttagttc ggtgagtttt 2520
agtttttgtg gttataagtg tattgttttt tttttttat aattagatgt ttttaaatgt 2580
agatttttgt tattttttgt gattttgttt ttgtcggtag gaggttgcgt tgtgtatgtt 2640
tttaggggta gtgatgtttg gggttaagcg tgtgcgggga tttgggagta gaagattgta 2700
ttagtttgtt ttcgtattgt tataaagaaa tatttgagat tgggtaattt ataaagaaaa 2760

gaggtttaat tcgtttatta ttttgtagtt gtataggaag tatagtggtt tttgtttttg 2820
gggaggtttt agaaaattta taattatttt ggacggtgaa ggggaaatag gaacgtttta 2880
tatggtagag tatgagtaag agagagagag agagagggga gaggtgttat atatttttaa 2940
ataattagat tatgtgagat ttttattata gaaatagtat taaagtagaa aatttattcg 3000
tattatttaa ttattttta taaggtttta tttttaatat tggggtttat aatttgatat 3060
gagatttggg cggggatata gatttaaatt atatttgaga gagaggggta tgaggagaag 3120
gtgaatgttg gggtagtaga gaggagtagg gataagttaa ttttattttt tattttttgg 3180
ggattagaat aggagagttc gattttgggg gtatagtatt atatattttg tgtgttcgtg 3240
tattagggga ggtgggagtt gttttttgt ttatgggatt tggttttatt tgttgagatg 3300
ttttatattt tagttttatt ttgggttgta gttttataga gtttgtgttt tttttttttt 3360
ttttgtttat ttttggattt ttttttttga attatttttt tttatttgtg gttttatttg 3420
ttttcgtttt aggtagttgt ttttggatta ttgttttgtt attattttg ggtttattgg 3480
tttttgttat ttgttttgag 3500

<210> 54
<211> 3315
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 54

tttttatttt tttattgtta tttatttagt gttgtgtagt agtttagttg tgtgtttgtt 60
gggaggggtt gttaagtgtt ttgtttattg gttgtttttt gaatttttgt tattttatgt 120
ataaatatat ttatatattt tttttgttta gtttatatat tgagttattt gtatatgtga 180
gtatattttt tttttttttt ttattttttt ggtttttgat ttttataagt ttatggaata 240
tttttggaaa gatgttttg atttagtagg gtaggtttgt tttgattttt ttttttgtag 300
ttttagtatt ttgagaaagt aatttatttt tttggttagt gtttgtattt tagtagggag 360
atgaggattg ttgtttttta tggggtatg tgtgtgtttt tttttttttt taggatttgt 420
aggatttttt gtgttatttg tatataattt ggtaggttta tattttttaa gagttttatg 480
aagtgttttt tgtatgtgtt ttaaaaaggt atttgaaaat tgaaagtgtg atttatggaa 540
attaaattat ttgtaaaaaa ttgttttgga aagtaatgat tgttggttat aaagggaaat 600
atttgtgatg tatttaatgt gtttttaatt ttttatttgt tgataattta tagttattaa 660
tgttaaattt gattttggtt ttagttatat ttgtatattg tttaataatg gtttattttt 720
gtaagaatta gataaaatgt atatttgata taaaatagtt aaaaatgtaa tttttagtaa 780
tagtaagttt ggtatttaga tagattatga atattttgtt agatattttg ttgggtgttt 840
gggatagtaa ttaaaataaa gtattgatag ttgtattaga gtttattagg ttgtagtaaa 900
ggaagtttat ttaaaagtat aaattattta agattataga tgtatgatat attttattta 960
tttttgttt ttttaatatg tatatatata tatatatata tatatatata tatatatgtg 1020
tgtgtgtatg tgtgtgtgta tgtttaattt ttaatttagt taaaaatttt tttttatttg 1080
tttttatttt ggatatttga ttttgtatat tttagtttaa gtgaattgag aagattgagt 1140
tgtaggatta aaggatagat atgtagaaat gtattttaaa aatttgttag ttggattaga 1200
ttgataatgt aatataattg ttaaagtttt ggtttgtgat ttgaggttat gtttggtatg 1260
aaaaggttat attttatatt tagtttttg aagttttggt tgtataatta atttgtggaa 1320
ggtatgaata tttatgtgtg ttttaattaa aggttttttt gaattatttt ttatatgaga 1380
atttttaatg ggattaagta tagtattgtg gtttaatata aatatataag ttaggttgag 1440
agaattttag aaggttgtgg aagggtttat ttattttggg agtattttgt agaggaagaa 1500
attgaggttt tggtaggttg tattttttg atggtaaaat gtagtttttt ttatatgtat 1560
attttgaatt tttgtttttt tttttttaga tgtttttgt tagtttttt agttgttaaa 1620
tatagttgtt tgtggttggt tgtgtatgta attgtatatt ttattttatt tgttttattt 1680
tggttatagt gtagtttttt ttagggttat tttatgtata tattatgtat ttttagttaa 1740
tgaggagggg gaattaaata gaaagagaga taaatagaga tatattggag tttggtatgg 1800
ggtatataag gtagtatatt agagaaagtt ggtttttgga tttgtttttt gtgtttattt 1860
taagtttagt ttttttggg ttatttttag tagattttg tgtgtttttg tttttggtt 1920
gtgaaattta gtttttattt agtagtgatg ataagtaaag taaagtttag ggaagttgtt 1980
ttttgggatt gttttaaatt gagttgtgtt tggagtgatg tttaagttaa tgttagggta 2040
aggtaatagt ttttggttgt tttttagtat ttttgtaatg tatatgagtt tgggagatta 2100
gtatttaaag ttggaggttt gggagtttag gagttggtgg agggtgtttg ttttgggatt 2160
gtatttgttt ttgttgggtt gtttggtttt attggatttg taggtttttg gggtagggtt 2220
ggggttagag tttgtgtgtt ggtgggatat gtgttgtgtt gtttttaatt ttgggttgtg 2280
tttttttttt aggtggtttg ttggtttttg agttttttgt tttgtgggga tatggtttgt 2340

```
atttgtttg tggttatgga ttatgattat gattttttat attaaagtat ttgggatggt    2400
tttattgtat tagatttaag ggaatgagtt ggagtttttg aattgtttgt agtttaagat    2460
tttttggag tggtttttgg gtgaggtgta tttggatagt agtaagtttg ttgtgtataa    2520
ttattttgag ggtgttgttt atgagtttaa tgttgtggtt gttgttaatg tgtaggttta    2580
tggttagatt ggtttttttt atggttttgg gtttgaggtt gtggtgtttg gttttaatgg    2640
tttgggggt ttttttttat ttaatagtgt gtttttgagt ttgttgatgt tattgtattt    2700
gttgttgtag ttgttgtttt ttttgtagtt ttatggttag taggtgtttt attatttgga    2760
gaatgagttt agtggttata tggtgtgtga ggttggtttg ttggtatttt ataggtattt    2820
gtgtttgtgt tgtttgttgg ggtggttgtt gtgtttggta ggagggaggg agggagggag    2880
ggagaaggga gagtttaggg agttgtggga gttgtgggat gtgtgatttg agggtgtgtg    2940
tagggagttt ggggtgtgtg gtttagtttg ggggttttgt gtgtagtttg tgttgtgttt    3000
agagttaagt ttttttgttg ggtagttgaa aaaaatgtat tttttattta tttattgttt    3060
gtgtgagagg tagatttgaa agtttgggtt ttttaataaa atatatgttg gaaaattaga    3120
taaagtagta gttatttgtg ggggaaaata tttttaggta aataaatatg gggtgttttg    3180
agttatttgg gaaggttttg tttttggtat ttaaagttgg gggtgtttgg agttagtaga    3240
gtttagtaga gttttattta ttttttttaat gtttttgttt aatgtgtttt ttaaattttt    3300
ttttatttag attat                                                    3315
```

<210> 55
<211> 3315
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 55

```
atagtttaga tgaaaggaaa tttggggagt atattaaata aaaatattaa aaggataaat      60
aaaatttgt tgagttttgt taattttaaa tatttttaat tttaaatgtt aagagtgaga      120
tttttttaag tgatttaaag tgttttgtgt ttatttgttt ggaggtgttt tttttataa      180
ataattgttg ttttgtttgg ttttttaatg tgtgttttgt taggaagttt gggtttttgg      240
gtttgttttt tgtatggatg gtaagtgggt ggagagtatg ttttttttag ttgtttggtg      300
agagaatttg atttgaatg tagtgtgggt tgtatgtaga atttttgggt tgggttgtgt      360
gttttgggtt ttttgtgtgt attttgggt tgtgtgtttt gtggtttttg tagtttttta      420
ggtttttttt tttttttttt tttttttttt tttttgttg ggtgtggtgg ttattttgat      480
gggtggtgtg ggtgtgggta tttgtagaat gttggtgggt tggttttgtg tattgtgtag      540
ttgttgggtt tgtttttttag gtagtagggt atttgttggt tgtggggttg taggaaaggt      600
gatagttgtg gtggtgggtg tagtagtatt agtgggtttg gagatatgtt gttgagtggg      660
gggaaatttt ttaggttgtt ggagttgaat gttgtagttt tagatttggg gttgtagggg      720
aggttggttt gattgtagat ttgtgtgttg gtggtggttg tggtgttgaa tttgtaggtg      780
gtgtttttgg ggtagttgta tatggtgggt ttgttgttgt ttaggtatat tttgtttagg      840
ggttgtttta gggggatttt gagttgtgga tggtttaggg gttttagttt gtttttttgg      900
atttgatgta gtagggttat tttagatgtt ttggtgtgga gggttatggt tatggtttgt      960
ggttgtgggt agggtgtaga ttgtgttttt gtagggtaga aggtttagaa attggtgggt     1020
tatttggaaa aagagtatag tttgaggtta gaggtgatgt agtgtatgtt ttgttgatat     1080
gtgagttttg gttttggttt tgttttggga gtttgtgggt ttggtgaagt tgggtgattt     1140
gatgggagta agtgtagttt taggatgaat gtttttttgtt agtttttggg tttttgggtt     1200
tttaatttta agtattggtt ttttgagttt atatgtatta taaaggtgtt ggaggatggt     1260
tagggattgt tgttttgttt tgatattggt ttaaatatta ttttaggtat aatttgattt     1320
ggagtgattt taaagagtag tttttttgaa ttttatttta tttgttgttg ttgttggata     1380
gaggttgagt tttatggtta gggggtgggg gtgtatgagg atttgttaaa ggtggtttag     1440
ggaagattgg gtttaaaata aatgtgaaag atggatttag gggttggttt tttttaatgt     1500
gttgttttat gtgttttgtg ttagatttttg atatattttt gtttgttttt ttttttgttt     1560
gatttttttt ttttgttggt tagaaatatg tagtgtgtat ataggatgat tttggggagg     1620
attatattgt aattgagata gggtagatag aatggggtgt gtggttgtat atgtagttag     1680
ttatagatag ttatatttag tagttggggg aattgatagg gggtatttga ggggaagggg     1740
gtggagattt agggtatata tataggaaga gttgtatttt gttattagga gaatgtaatt     1800
tgttaggatt ttagtttttt tttttgtaaa atgtttttaa agtagataga ttttttttata     1860
atttttttgag atttttttag tttgatttgt gtgtttatgt tggattatag tattgtattt     1920
ggttttatta ggaattttta tgtgaaggat gatttagaaa aatttttggt tagggtgtat     1980
atgggtgttt atgtttttta taggttggtt atgtaattaa aattttagaa aattgaatat     2040
aaaatgtgat tttttttatat taaatataat tttaggttat gaattaaagt tttggtaatt     2100
```

atgttatatt gttggtttgg tttagttaat agatttttaa aatgtatttt tgtatgttta 2160
tttttagtt ttataatttg attttttgg tttatttggg ttaggatatg tagaattaaa 2220
tatttagatg aaaaataaat agaaaaaagt ttttaattga attaaaagtt aaatatgtat 2280
atgtatatat atatatatat atatgtgtat atatatatat atatatatat atatatatat 2340
taaggagata aaaaataggt gaagtatatt atgtgtttat aattttggat agtttatatt 2400
tttgaataaa tttttttgt tgtagtttaa tagattttga tataattatt aatattttgt 2460
tttaattgtt attttaaata tttaatagag tatttgatga agtgtttatg gtttatttaa 2520
atgttaagtt tattgttatt aagagttata tttttgatta ttttatatta agtatatatt 2580
ttatttaatt tttataaaaa tagattattg ttggataata tgtaaatgta gttgaagtta 2640
aaattgagtt tagtattaat gattatagat tgttagtaaa taaagggtta aaaatatatt 2700
aggtgtattg tagatatttt tttttatggt tagtaattat tattttttaa agtaattttt 2760
tatagatgat ttaattttta taaattatat ttttaatttt taaatgtttt tttaaaatat 2820
atgtaaaaag tattttatag ggtttttaaa aaatgtgaat ttgttaaatt atatgtaaat 2880
ggtataaaga attttataag ttttgaaaga aaaaggagat atatatatat ttttatggag 2940
aatagtaatt tttatttttt tgttaggata tagatattag ttagaaaggt aagttgtttt 3000
tttaaaatgt taaagttata gagagagaaa ttaaaataag tttattttgt tggattaaga 3060
atgttttttt agaaatgttt tatgggtttg tagaagttaa gggttgagag agtgagaagg 3120
aaggaaggaa tgtgtttgta tgtgtgagtg gtttagtgtg tgaattaggt agagagagtg 3180
tgtggatgtg tttgtgtgtg gaatggtagg gatttgggaa gtagttagta ggtagggtat 3240
ttggtagttt tttttggtag atatgtagtt gggttattgt atagtgttgg atgaatggta 3300
gtggggagtg agggg 3315

<210> 56
<211> 7369
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 56

tagaagtttt tttttagagt gtgtttgggt atatatttaa gtgtatggtt gtaaattttt 60
tttttaaag tattgaatag tattagatat ttagtaggta tttaagaaat attgaatgtt 120
gtggtggtgg tgagttagaa gttataaaaa aaattttttt ttaaaaataa taataaaaag 180
aattatttta ttgtgaagtt tagtattata aaaatttaaa taatttatta taagttttta 240
ttaaaaaaaa tttttttttt aaagtaaata gatagataat gtttagttta tttgaaatgt 300
ttgaaagtag aggggtttta aggtagtggg agaaggtgtt tgtttttgt tggatatttg 360
ataattagtt ttttggatgg tttggatgta taggagtgaa ggtgtagata gtagtggggt 420
ttagagtggg gttttgaggt tgtgttgtgg tttttttggg gtttagttat aattttggtt 480
tgattttagg gtgaggtagg ttaagggggt ttgttattgt gtttttttat ttttatttgg 540
gtttttattt ttatagtaga ggagaaagaa gtttgttttt tttgaggtta gttgtgttag 600
aggaagaaga ttgggtatgt ttgggtagag atttttagat tttgagtagt ttgagatgtt 660
agtaattgta gttgttttaa gtttgggttt tgtttttag tgggattttt gtttagatga 720
ataatttatt ttttgtaatt ttttaaaagt aaaattgtaa atgttttagg tatagaaagg 780
aggtaaaggt gaagtttagg ggaggttagg ggtgtgaggt agatgggagt ggatagatat 840
attatttatt tttgtgtttg ttagaagaat tagtagatat ttttagaatt gtttttttatt 900
tatgttattt ttataaatta tttgtaaatg agggttattt ggtatttttg ttattttgga 960
gttatagaaa taaaggatga taagtagaga gttttgggta ggaggtaaaa gttttgtgtt 1020
ttaattatag ttatttttt gttgtatgat ttgagttagg ttattagatt tttttgagtt 1080
ttagtttttt tagtagtgta tatgggttat gtggggagta tttaggagat agataattta 1140
tttgttaaat tttttttttt ttggttaata aagttgttgt aattataggg attttttttg 1200
tttaggtgag tgtagggtgt agggagattg gtttaatgtt taattttttt gtttttttgg 1260
agattaggtt gtttttttttt ggtagttttt ttaatttttt ttttttttgga agtatgtgat 1320
aattaataat tttgtatatt taagtttagt ggattttaat tttttattt gtgaaataaa 1380
tgggattgaa aaattatttt ggttttaaga tgttttgttg gggtgtttag gtgttttagg 1440
tgtttttggg agaggtgatt tagtgaggga ttagtgggaa tagaggtgat attgtggggt 1500
tttttttggaa attgtagaga ggtgtattgt ttttataatt tatgaatttt tatgtattaa 1560
tgttattttt ttgattttt tagttgtatt gggtaaattt ttgtttgtta gagtgggtta 1620
gtggtgagtt agaaaggggg tttattttaa tagtgttgtg tttttttgga gagtgttaat 1680
ttatttttta agtaaaaaaa gttagatttg tggtttattt tgtggggaaa tgtgtttagt 1740
gtattaatgt aggtgaggga ttgggggagg agggaagtgt ttttttgtag tatgtgaggt 1800

```
tttgggattg gttggtttgt tggaatttgg ttaggtttag ttggtttggt gttgggtagt     1860
taggagtttg ggttttgggg agggtggttt tgggtggtgt ggtgggttga gtgtgggttt     1920
tgttttttttg aggtgggttt gggtggggtg gttgtatatt agggttgtgt tgagttgtgt    1980
tagttgaggt gtgagtagtt gttgaagtta gtttttgtg gagttggagt tgggtgtgga      2040
tttgttgagg tattgaggta tttagaggag gtgagagagt ggtggtagat aataggggat     2100
tttgggttgg tggtttagag ttgagttaag tgtgtttgtg tgtgtttttg tgtgtttgtg     2160
aggatgtgtg tttgtgggtg tgtgttgtgt ttataggtgt ttttgtggta ggtgaatgat     2220
gggtgtgggt tggtgtgtgt ttggtttgtg tatatggtgt ttttaagtgt gtgggtgatg     2280
agagttggga tgtgttggag attttggggt ggagagtggg attataagta taggaatttt     2340
tggttatgtt ttttgttttt ggaaatttag ttggggtgag ggagggtgtg gatgggattg     2400
ttttgggagt ttgtttttgg ttgtggttgg ttttaggttt taggtgtagt ttgtttgtgg     2460
tgtggggatg aagtttgtgt ttttggaggg gtttaggaag ggtgaggaaa gtggagtgga     2520
gtaagtttgt ttaggattgg ttttgggtgg ttttgggatt taatttgtgt tgttttggtt     2580
taggttttag gtttaggttt tttatgttat tgtgtttatt atttggttga gtgttgaggt     2640
tagtgtgggt tgttttttgg tttttgggaa tgtgttagga tttgtttttt aaggattagt     2700
gaggaggtga tttattgtga taaggagatt ttagggaatg gattgtatga ggttagaatt     2760
ttgtttggga tggggtatag tgggatttta gaagtttttt tttttgtttt tttgtggttt     2820
ttgttttttt attggtatag tgatttattt ggttggaata gtttgttttt aaggaagttg     2880
ggtattggag gtttgggata ttgtgttggg tttttgtttt gtggtgtgtt gtaggggttg     2940
gggagttatg gttttgtttt gggtgggttt taattagttt gttagttggg gaagggtaag     3000
ggtttttttt atttttttttt tattgtggtt gggagaattg tggtttagtt tgtttttggg    3060
ttggggtgtt ggattttggg gtgggagtgg agtttatgtt tggatgggag gtggggaggg     3120
tttatgtttt tgaggggtgg ggggtttggg gggtatgatg ttgtttaggg tttttattag     3180
ttgttttggg ggtttagggt tttttgattt agtttagatt tttttttttga aagttatagg    3240
gttgagtgga gtaggggggt gagttgtttt ttggggtgtt gttgtttggt gtggattata     3300
gtgtgttttt tttgttttaa attttggggg gatatttgtg ttttttttgt gaggaaaagt     3360
attttggagt tgggttagga atttggggtg tttaggtagt tttttttttt tttgtttttt     3420
tttatgttgt gtttttggga ggatttgtga gtggtttttgt ttttgttgtt tttgtttatt    3480
tttattttttt agggatttga tttattttgt gttttgggtg tggagataag gtggaggggt    3540
tggtttttgg tgtgtgtgtg tgtgtgtgtt tgtgtgggtg tgtgtgtgtg tgtgtgtgtg     3600
tgtgtgtgtg tgtgtgtttg tgttagagat ggtataagag tgtgtggttt tttaatagtg     3660
gtgggagttt tggaagtttg gttggtttag tgtgatgtgt ttgtggtttt ttggtttttt     3720
tttatttttt tttttttat tttagggtga tgtgtagttg gagtggaagt agttttggtg      3780
ggtgagtagt gttttgtagg aaattgattt attattattt tttttagtgg tttgaggttt     3840
tgtttatgta tttttttattt tgtgtgtgat tttttggagg ttggtgtttt tttttggttt    3900
tggtgggaat agtatatagg ttttttttgtg gagtggggtt ggttggtgtg aattgttgtg    3960
gttatttttg ggtttatttg agattaattt ttatgttatt attatttttt taaaggagta     4020
tttttttaggt ttaatagtat ttattgagtt tttattggaa attaaaatat ggttgaagtt    4080
taaggtagga aggttaataa aggaggttat ttttaattgt ttttaaaata agggtttgtg     4140
tttttgagtt tttttttgggt tgaaagttat tatgagtatg agagtagatt ttgatgggggg   4200
aggagaggtt tatgagagtt ataagagaag gaggggtggt agaagaggag agggtgtttg     4260
tttagatttt agttttgttt tgaattttttg agagttaggg aatatttagt attttgatga    4320
agttttaggt gggtgttttt tttttgtgtt tatgatgtat tgagatttag aatgtttatt     4380
ttaaatatat tagtgtgttt ttgtttggtt ggtaatttaa gagtgtttat ttgaggaatt     4440
gtgttaaata tttgtttgaa tttttaattt ggattaagtt ggttttggga ggtagggttt     4500
tagtaattta tattttgaaa aaattttta ggtgtttttt tttttttttt ttttttttt       4560
ttttttttt ttttttttt ttttttttt ttttttttt ttttttttt ttttttttt           4620
ttttttttt ttttttttt ttttttttt ttttttttt ttttttttt ttttttttt           4680
ttttttttt ttttttttt ttttttttt ttttttttt ttttttttt gatagagttg          4740
tattttgtta tttaggttgg agtgtaatgg tattattttg gatttaagta gtttttttgt     4800
tttagttttt taagtaattg ggattatagg tgtgattttt ttgtttttat gtttagattt     4860
ttttttttt ttttttttt ttgagatgtg gttttgtttt gttatttagg ttggagtgta       4920
gtggtgtgat tttggtttat tgtaagtttt gttttttggg tttatgttat tttttttgttt    4980
tagtttttttg agtagttggg attataggtg ttgttattat gtttggttaa tttttttttg    5040
tatttttagt agagatgggg ttttattgtg ttagttagga tggttttaat tttttgattt     5100
tgtgttttgt ttttttttggt tttttaaagt gttgggatta taggtgtgag atattgtatt    5160
taattattta gttaattttt atttattttt atttttagta gagatagggt tttagttagt     5220
tgtttaggtt agttttggat ttttgggttt aaatgatttt tttattttttg tttttttagag   5280
tattaggatt ataggtataa gttattgttt ttggtttttt taagtgattg tgatgggttt     5340
ttttggttaa gaaattttaa aattagagag ggagtggggt ttaatattat agtataggat     5400
ttagggtaaa taggtttggg tttagatttt ggttgtgtta tttatgaatt gtgtgatgtt     5460
aggtaagtta tttaatttat ttgagttttg gttgtttttt ttgtaaaaag ggagttaata     5520
gatatttatt ttttaggagg attgatattt ttaaattgtt tagaatagtt tttaaatata     5580
```

aaaatatata aataaatttt aatttatgtt tagtagaggg tggatagagg ttatttgagg 5640
gttttgttta ttgtattggg tgattttttt atggggtagt ggtttttggt ttttttagtt 5700
gtatgattta ggggtaagtt ttatattttt tttatttttt gtttttttaaa tttggtgtga 5760
agttattaag agtttttttt tttaattagt tgggatgtga aattgtgggt tttattgatt 5820
ataagtagtg gggtgaggtg gggtggagta gatgtggtat gtgttttggg tttttttgttt 5880
tatgaggatt tagtagagtt tttattttta gaaattgtaa gttgggattt gtttttagga 5940
aaatttagtt gttgttaagg ttgtgtagtt atttagtttt ggagttaagt tagagtaggt 6000
aggtaggtgt tagggttttt ttatgggtaa atttattttt tgtttttttt tttttgaagg 6060
gggaggagag gagttaggta gattagttat ttttaatttt tttttttgttt gtaaaatggt 6120
tttttttggat ataggtaata tgaggtaggg gttgttaggt gtttagattt tagattattt 6180
gatgtgtttg gtaggatgtg gtttagtttg ggagaaatta tttttttgtgt tgttttgttt 6240
ggtttttttt tatttttagg ttatttgttt gatgatattt ttgggaaagg tttttagttt 6300
atagtatttg ttagttgttg tttgaaggag gtagttggta gggggaagtg atagggggga 6360
ggtttagtaa aattgaaggt agagaggaat aattatattt ttgtttttaa tgtatttttt 6420
tatatgaagt gttgttggta tgttatttat attaatttag ttaattttta tgtttatttt 6480
ttgagatagt tattattatt atttttattt tatagatgag gaaattagag tttagataag 6540
ttaagttgtt tgtttagggt tatttagtaa aatttggatt ttagtttagg tgatttggtt 6600
ttagagtttt tttgtttaat tattaggata tagtttttta tttagttttg ttttgtttgt 6660
tttgttgtat ggatttgtg attaattttt tgagtatgtg tttgtagtta tgttttttaa 6720
atttgtatat ggttttattt atggatgagg aaattgagat ttagagatat taagtggttt 6780
tttaaagttt atgtagtaat tggtagagtt aggattataa tttgggtgtt ttttgtttta 6840
aagttttggg tatttttatt tggtagagta gggttatttt atttggggat ttgggttggg 6900
ggatttagga ggttggagga attgttagat tgtttttttt tttgggaatt gatttttttgg 6960
ttagggttgt gattaggaaa ttgttggatt ttggtaattt atatatattt gggggtatt 7020
tatatttatg agggatattt ttgggggggaa aataaattga ttttagttga taatatttgg 7080
tggtaaatag gattttggtt tttgtttttg taatagattt gtttttgttg atattagttt 7140
gtttttttagt tgtttgtttt tttagtgatt ttggtgtgtt aggttggttg agttttgttg 7200
gtgggggtta ggtttttttgt gggaaggaag taggaagatt agttggaagg agtgagagag 7260
attttttggt aggaagatgt tatttgaggt gatatagtaa agtttggtta ggtaatatag 7320
tgtttaattt ttgttgtgat tagggttttt tttgtatttt tgttgtagg 7369

<210> 57
<211> 7369
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 57

tttgtagtag agatataagg aaggttttgg ttatggtgga gattagatat tatgttattt 60
ggttgggttt tgttgtgtta ttttaggtga tgttttttta ttagagggtt tttttttattt 120
tttttagttg gtttttttgt ttttttttta taggaggttt gatttttatt agtagagttt 180
agttagtttg gtatattaag gttattggga gagtaggtaa ttgaagggta agttaatgtt 240
aataaaggta agtttattgt aagagtaagg attagggttt tgtttgttat taggtattat 300
tagttaaaat taatttgttt tttttttaga ggtgtttttt atgggtgtga atgttttttta 360
aatatgtgtg aattgttaga gtttagtagt tttttaattg tagttttggt tagaaggtta 420
atttttaaaa gaagaaatag tttgatagtt tttttagttt tttaagtttt ttgatttaga 480
tttttaagta gggtaatttt gttttgttaa gtaaaagtat ttgggatttt ggggtaaaaa 540
gtatttgggt tgtggtttta gttttgttag ttattatgta agttttaaaa agttatttaa 600
tgtttttagg ttttagtttt tttatttata aatggggtta tgtataagtt taaagagtat 660
ggttatagat atatatttaa gaaattgatt atagagttta tgtagtaagg tagatagaat 720
agagttgaat gaaaggttgt attttggtgg ttaagtagga gggttttgga gttagattat 780
ttgggttgga gtttaggttt tattaggtga ttttgggtaa gtaatttaat ttgtttgagt 840
tttagttttt ttatttataa aatggggata gtaatagtga ttgttttaga ggatagatat 900
gagaattaat tgagttaatg taggtaatgt gttagtagta ttttgtatag agaagtgtat 960
tgaaaataga agtatgatta ttttttttttg tttttagttt tattgagttt ttttttttatt 1020
attttttttt gttaattatt tttttttagat agtagttgat aggtgttgta ggttgagggt 1080
ttttttttaag gatgttgtta ggtgggtggt ttaggggtaa ggaggggttg ggtggggtag 1140
tgtaagggat gatttttttt aggttgagtt atatttttgtt aggtatatta ggtgatttga 1200
agtttagata tttggtagtt tttgttttgt gttgtttgtg tttaaggaaa ttgttttgta 1260
ggtaaaaaga aaattaaagg tggttggttt atttggtttt tttttttttt ttttaggaga 1320

```
gggaaaatgg agagtgagtt tgtttatgag ggagttttgg tatttatttg tttgttttgg 1380
tttgatttta gggttgagtg attgtatgat tttggtagta attggatttt tttagggata 1440
agtttaatt tgtagttttt gggggtgaaa gttttgttga gtttttatga ggtaggaagt 1500
ttgggatata tgttatattt gttttatttt attttatttt attgtttgtg attagtggag 1560
tttatagttt tatgttttag ttggttggga gaggaggttt ttggtaattt tatattaagt 1620
ttaaagggta ggagatggaa gagatatgag atttgttttt gagttatata gttaaaaagg 1680
ttaaaggtta ttgttttata aaggggttat ttagtatagt ggatagagtt tttaaataat 1740
ttttatttat tttttgttag gtatgagttg ggatttattt atatattttt atgtttgggg 1800
gttgttttaa gtagtttaaa aatattaatt tttttaaaaa gtggatattt attagttttt 1860
tttttataga agaggtaatt aaggtttaga taagttaagt aatttgttta atattatata 1920
gtttataagt ggtatagtta ggatttgaat ttaggtttgt ttgttttgag ttttgtgttg 1980
tagtattgaa ttttattttt tttttaattt tgaggttttt taattagaga ggtttattat 2040
aattatttgg ggaggttagg ggtagtggtt tatgtttgta attttaatat tttgggaggt 2100
agaggtggga gaattatttg agtttaaggg tttaagatta gtttgggtaa ttagttgaga 2160
ttttgttttt attaaaaata aaaataaata aaaattagtt gggtggttgg gtgtagtgtt 2220
ttatatttgt aattttagta ttttgggagg ttgaggaggg tggagtatga ggttaggaga 2280
ttgagattat tttggttaat atggtgaaat tttgttttta ttaaaaatat aaaaaaaaat 2340
tagttgggta tgatggtagt atttgtagtt ttagttattt gggaggttga ggtaggagaa 2400
tggtgtgaat ttgggaggtg gagtttgtag tgagttgaga ttatgttatt gtattttagt 2460
ttgggtgata gagtgagatt gtattttaaa aaaaaaaaaa aaaaaaaaaa aatttgggta 2520
tgggggtggg gggattatgt ttgtggtttt ggttatttgg gaggttgaaa taggaggatt 2580
atttgagttt aggatggtgt tattgtattt tagtttgggt gatagagtgt aattttgttg 2640
aaagaaaaga aagaaagaga gaaagagaaa gaaagagaga aagagaaagg aagaaagaaa 2700
gaaagaaaga aagaaagaaa gaaagaaaga aagaaaagaa agaaaaagaa agaaagaaag 2760
aaaaagaaag aaagaaagaa agaaagaaag aaagaaagaa agaaagaaag aaagaaaaaa 2820
agaaagaaag aaaagtattt agggagtttt tttaaaatat agattgttga ggttttgttt 2880
tttgagatta atttaattta gattgaagat ttaagtaagt gtttggtata atttttaga 2940
tgggtatttt tgggttgtta gttaagtgga gatatattgg tatgtttgaa atggatattt 3000
tgggttttaa tatattatag gtataaggag gaggtgtttg tttagggttt tattaaggtg 3060
ttggatattt tttggttttt gggagtttaa gataggatta ggatttaggt aggtattttt 3120
ttttttttta ttattttttt ttttttatg gttttatag gtttttttt ttttattaaa 3180
atttgttttt atgtttataa taatttttag tttaaagaaa atttagaaat gtaaattttt 3240
gttttagaaa taattaaaaa tagttttttt tattggtttt tttgttttag attttagtta 3300
tattttaatt tttagtaaga gtttagtgaa tattgttgaa tttaaggagt gtttttttga 3360
aggggtggta atggtatagg ggttgatttt ggatgagttt aggagtagtt gtggtggttt 3420
gtgttggtta gttttatttt gtgggaaagt ttgtgtgtta tttttgttag ggttgggagg 3480
gggtgttggt ttttaggaaa ttatgtgtgg agtgggaggt gtgtgggtag agttttggat 3540
tgttggaggg agtagtgatg agttagtttt ttgtaaggtg ttgtttgttt gttaaaattg 3600
tttttatttt ggttgtgtgt tattttgggg tggggagggg gagaatggga ggggattggg 3660
gggttgtgaa tatgttatgt tgagttggtt aggtttttga aatttttgtt gttgttggga 3720
aattgtgtgt ttttgtgttg tttttgatat agatatatat atatatatat atatatatat 3780
atatatatat gtttgtgtag atatgtatgt gtgtgtgtgt tgggagttgg tttttttatt 3840
ttatttttat gtttaaagta tgggatgagt tagattttg gaaaataaaa atagatggga 3900
gtaatgaaaa taaaattgtt tgtaagtttt tttagaaatg tgatgtggag ggaggtaagg 3960
agaggggaag ttgtttgggt gttttaagtt tttaatttag ttttaagatg ttttttttta 4020
tgaagagggt gtaagtgttt tttaggggtt tgggatggag aggatgtgtt gtggtttgtg 4080
ttaggtggtg gtgttttagg gggtgatttg ttttttttgtt ttgtttagtt ttgtagtttt 4140
tggagaggga atttgggtta ggttgggaag ttttgagttt ttgaggtagt tgatagaggt 4200
tttgagtagt gttgtgtttt ttagattttt tattttttaa agatatgaat ttttttttgtt 4260
ttttatttag gtgtgggttt tgtttttgtt ttggagttta gtgttttgat ttgaggatag 4320
gttgggttgt gatttttttg gttgtggtgg gaaagaggta gaggagattt ttgttttttt 4380
ttgattgata ggttggttag agtttgttta gagtagggtt gtgatttttt gatttttata 4440
gtgtgttgtg gagtggggat ttgatgtggt gttttggatt tttagtgttt ggtttttttg 4500
ggaataaatt gttttagtta aataggttat tgtgttgatg ggaggatgga gattgtgaag 4560
gggtagggga gagggttttt ggagttttgt tgtattttat tttgggtggg gttttgattt 4620
tatatagttt gtttttttggg gtttttttgt tatagtgagt tatttttttg ttagttttta 4680
ggggatgggt tttggtatat ttttaagggt taggaaatag tttgtgttga ttttagtgtt 4740
tagttaggtg gtggatatag tggtgtaaag gatttgaatt tgggatttgg gttagggtgg 4800
tgtagattgg atttagagt tatttgggat tgattttaga tgaatttatt ttattttgtt 4860
tttttgttt tttttgggtt tttttaggga tatggatttt atttttatgt tgtgagtaaa 4920
ttgtgtttgg ggtttggagt taattgtagt taaaggtgag tttttagaat ggttttgttt 4980
atgttttttt ttgttttagt tgggttttta ggggtgggga gtgtgattag ggattttgt 5040
atttgtaatt ttgtttttttg ttttggggtt tttggtatat tttgattttt gttatttgtg 5100
```

tatttagaga tattgtgtgt gtaagttgag tgtgtattga tttatgtttg ttatttattt 5160
gttgtagaaa tatttgtgaa tgtagtatat atttgtgaat atgtattttt gtggatatgt 5220
agggatatat gtgggtatgt ttggtttggt tttgggttgt tggtttgggg tttttttgttg 5280
tttgttgttg tttttttatt ttttttgagt gttttggtgt tttggtgaat ttgtgtttag 5340
ttttggtttt ataaggaatt gattttggta gttgtttata ttttagttgg tgtagtttag 5400
tgtggttttg atatataatt gttttgtttg ggtttgtttt aaggaggtgg gatttgtgtt 5460
tggtttattg tgttgtttgg gattgttttt tttggggttt aggtttttgg ttgtttagtg 5520
ttgagttagt tgagtttggt tgagttttag taggttagtt ggttttggaa ttttgtgtgt 5580
tgtaggaggg tatttttttt tttttttagt tttttgtttg tgttggtgtg ttggatatat 5640
tttttttatga agtgagttat aaatttggtt ttttttattt ggagaatgag ttggtatttt 5700
ttaggaggat atagtattgt tagaatgagt ttttttttttg gtttattgtt gatttatttt 5760
ggtaggtaag gatttattta atgtagttga aaagattagg aggatgatat taatatataa 5820
aaatttataa attataaaaa tgatgtattt ttttgtaatt tttagaaaag ttttataata 5880
ttatttttat ttttattgat tttttattag gttatttttt ttagaagtat ttggagtatt 5940
tagatatttt aataaagtat tttgaggtta gaatgatttt ttagttttgt ttattttata 6000
gatgaggaaa ttgaggttta ttgaatttaa gtatataaag ttgttgattg ttatatgttt 6060
ttgggaagga gggaattgga gagattatta aaaaagggta atttgatttt tagggaaata 6120
gaagaattgg atattgaatt aatttttttta tattttatat ttatttgaat agaagaaatt 6180
tttgtggttg tagtagtttt gttggttagg aaggggagga tttgatgagt gagttgtttg 6240
ttttttgaat atttttttata tagtttgtat atattgttgg ggaaattggg gtttagagaa 6300
gtttggtgat ttaatttaga ttatgtagta aagaaatgat tatagttgga atataggatt 6360
tttgtttttt gtttggggtt ttttgtttgt tattttttat ttttgtggtt ttaaaatgat 6420
aaaaatgtta aataattttt atttgtagat ggtttatgga gatgatataa ataaaggata 6480
attttggaag tgtttattgg tttttttgat agatatagaa atgagtgatg tgtttatttg 6540
tttttattta ttttatattt ttgatttttt ttggatttta tttttgtttt tttttttgtgt 6600
ttgaaatatt tgtagttttg tttttaaaaa attgtagagg atggattgtt tatttgaata 6660
gaaattttat taaaaaatag aatttaggtt tggagtagtt ataattattg atattttagg 6720
ttgtttagag tttggaaatt tttgtttaga tatgtttagt tttttttttt taatgtagtt 6780
gattttgggg aggataggtt tttttttttt ttgttgtggg gatgggagtt taggtagggg 6840
tgggaggata tagtagtaga ttttttttggt ttgttttgtt ttggagttag gttaggattg 6900
tggttaaatt ttagaaaggt tatggtatag ttttaggatt ttattttaag ttttattgtt 6960
gtttgtattt ttgtttttat atatttaaat tatttaaagg gttggttgtt aaatgtttag 7020
tagaggatag gtattttttt ttattgtttt gaagtttttt tgtttttagg tattttaaat 7080
agattagata ttgtttgttt gtttattttg gggagaaaat ttttttttaat aaaggtttgt 7140
aatgaattat ttaaattttt gtggtattga gttttataat gaaataattt tttttgttgt 7200
tgtttttggg aaagaatttt ttttataatt tttagtttat tattattatg atatttaata 7260
ttttttaagt atttattaag tgtttagtat tatttagtgt tttaaaaaaa aaagtttgta 7320
attatgtatt tgaatgtgta tttagatata ttttaaggga ggattttg 7369

<210> 58
<211> 2986
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 58

gagggttttt tttagttgtt atattttgga gtgtatgaga tgaggtaggt atataaagtg 60
gataagatgt ggttaagaaa ataagttata tattaagttt atttgtagta taggtgttta 120
agaaaatttt gttgttgtgt aatattagaa tggaaggttg gtttttagta aaatgtatta 180
attttggttt aaattaagat gatgggtatt gggtatgggg gtggggaggt agttgaagat 240
ttattgagtt ttgttttagg gtagttttgt ttattgtttt attttatttt ttattatggt 300
gtttaagttt atattgagag agaaattttt agttgtaaaa gggagaagag aaatgttgga 360
atattagtat tggatgttag gatatggttg tggtgtttta aaaattattt tattatttgg 420
agtttgattt tgaggggagt atttttattt tttagttttt tgaaagtatt tattagtatt 480
tgaatattgt tttgagtttg ttggagtagt gaaatttggt gagagagaag ggtggaggaa 540
ggaaggagtt gttgtatttg gtggttggat ttaggtagag gaaattgtta taattttggg 600
aaagaataga aaagtagaaa gggatgagtt tttatatgta gttaatgttt atggttttaa 660
ttgtgtttgg gaaggaagat tttgggttag gggtgtattt ttgtttttta aaattaaatg 720
tgtttgagat agttataaag tttattaagg gatttgagag attagagttt tttgtttttt 780
tttttttaatt ttgagttttt tttttatttt tattgaggga gagtttgagt ttatgataag 840

```
tgttgtgttt atttttggtt aatttttaaa agaaagatgt ttgttttggt ttttttttta     900
ggtttttagt tttttttaggg atggtagaaa tttttgggtt aaggttgagt gaattattgt     960
ttattgtttt tattagtttt tagtaaaggt atgttggtgg gggggtgttt agtttttttta    1020
gtaaatgttt tgtggttttt tttgtagatt atgaggtggg ggttgttggg gagggttgag    1080
ttgggggtag tttgttattt tggtttttag tgagttgttg gtgatttttg tggtttttttg    1140
gtttaggttt tggtttttttg ggtgaggagt gggagggagg ttggggttta ggtgttgtgg    1200
tgaatttgtt aatgtagtgt tgggttttga attttaggtt ttgttttagg tttttggttg    1260
tttggttagt ttgtttgttt taattttaat ttttttgagg ttagttagag taggtttgtt    1320
ggtagtagta ttttttttagt agttatgtga ttagttaatt ttttggtggt gtttggggag    1380
gtggtgtgtt tgggaatgag gggaggtggt ggaattgtgt tggggttatt ttaaggttgt    1440
gtttgttagt tttggtgggg tggtttttgt tgttgtaatt aatggatttt ttttttttgtt    1500
taaatagatt tgttgtgtta attatttttt tttttgttag ttttttttttt attgttatat    1560
tgggttatta aaaaaagggg gtttgttttt ttggggtgtt ttttttttttt tttttgttt    1620
ttgtttgttt atggttttgt gattttgatg ttggtaaggt ttggagagtg gttgggtttg    1680
tgggatttgt gggtttgtat ttgtttagat ttggatgggt tttgttattt tttttgtttg    1740
tttggttttt ttttttttttt gtttttttgt ttgttagttt atttgattag tggagatttg    1800
gtggttgggt tggggttttt ttgtagtttt tgtgtgtttt tagagtttgg gttgtggttt    1860
gttggggttt gtgtttttttg gttttgaggg tagttgttgg gtttttgaga ggggtttggg    1920
ttgtgtaggg gtgttttgtt ttgtttggtt ttgttttttt gagagtgtga gagaggtggt    1980
tgtgtagatt tgggagaaag atgttaaatg tgtgagtgtt taatgggagt tttagtttgg    2040
agtggatgga tgttaggtag gtggagtatt ttaagttttt ggtttgtagg aatttttttg    2100
gtttggtgga ttatgaagag ttaatttggg atttggagaa gtattgtaga gatatggaag    2160
aggtgagtta gtgtaagtgg aattttgatt tttagaatta taaattttta gagggtaagt    2220
atgagtggta agaggtggag aagggtagtt tgtttgagtt ttattataga tttttgtggt    2280
tttttaaagg tgtttgtaag gtgttggtgt aggagagtta ggatgttagt gggagttgtt    2340
tggtggtgtt tttaattggg gttttggtta attttgagga tatgtatttg gtggatttaa    2400
agattgattt gttggatagt tagatggggt tagtggagta atgtgtagga ataaggaagt    2460
gatttgtaat tgatggtaat gatttttttt taattataga atgtgtttgg ggttttgttt    2520
tgtttgttgg agggtgttaa ttttagtttg tttttttggtg tattttgatt tagttttggg    2580
agagttaatt ttattggttt taggtgttta gtgttatttg gtttattgtt tgtttgtttg    2640
tgatttttaa gttagaaatt ggagatggta agatttgata attttttttaa tttaatatat    2700
tgtggttttt tttattagta atttttaggt atgtgataaa gttgggatgt ttattaatgg    2760
tttgtttttt ggttagggaa agagttttgg ggtggagaat gtattttttg tttttttgaaa    2820
ataattttat tttgtgtttt taaaagttat tggggatgat ggatttagga ttgtgggtgg    2880
aggtagtggg ttttttattt tttgattatg gggttaattt ttgttagtta ttgtttttttt    2940
taataaagat tgtgtgtttt ttttaaaaat ttttttgtg tttaga                   2986
```

<210> 59
<211> 2986
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 59

```
tttaagtgta ggggaaattt ttaaaaagaa tatataattt ttattagaaa aaataatggt      60
tggtagaagt tggttttata gttaggggat gaaaaattta ttatttttat ttataatttt     120
ggatttgtta tttttagtgg tttttaaggg tataaaatga ggttgttttt aaaaaataga     180
aagtgtattt tttgttttag agtttttttt ttagttagga ggtggattgt tgataaatat     240
tttaattttg ttatatattt aggagttgtt agtgagaggg attgtgatgt attaagttag     300
ggaaattatt ggattttatt atttttagtt tttgatttaa aagttataaa tagataagta     360
gtgggttagg tagtattgaa tatttaagat taataaagtt agttttttta aagttaaatt     420
agaatatgtt gaaaagtaag ttaaggttaa tattttttag taggtaaagt ggggttttaa     480
atatatttta tggttgggaa agggttatta ttgttggttg taggttgttt ttttattttt     540
gtgtattgtt ttgttaattt tgtttggttg tttgatggat tagttttggg gtttattaaa     600
tgtgtgtttt tagagttagt tggagtttta attaaaggtg ttgttgggtg gtttttgttg     660
atatttggt ttttttgtgt tggtattttg taggtatttt tggggggttg tggggggtttg     720
tagtagaatt tgggtaagtt gttttttttt atttttttgtt atttgtattt gtttttttagg   780
ggtttgtgat tttgaaaatt gaaattttat ttgtgttggt ttgttttttt tatgtttttg     840
tagtgttttt ttaagttttg ggttaatttt ttgtggttta ttgggttgaa gaggtttttg     900
taggttgagg gtttggggtg ttttgtttgt ttggtgttta tttgttttag gttagggttt     960
```

ttgttagata tttgtatgtt tgatattttt tttttgggtt tgtatgattg tttttttgt 1020
atttttaaaa aaataaaatt gaataaaata aagtgttttt atgtagtttg aatttttttt 1080
ggaagtttag tgattgtttt tggagttaaa agatatagat tttgatgagt tatggtttga 1140
gttttaggag tgtgtagggg ttgtggggaa gttttggttt ggttgttgag tttttgttga 1200
ttaaatggat tggtgagtgg gagggtggag aggagagggg attaggtaag tggagagggt 1260
ggtaaagttt gtttgagttt gggtgggtgt aagtttgtgg gttttgtgaa tttagttgtt 1320
ttttaaattt tgttggtgtt ggagttgtag agttgtgagt aagtggggat aggggagggg 1380
gagaaaaata ttttgaaaag atgagttttt tttttttagt ggtttaatat ggtggtggaa 1440
gggaggttga tgaagaagaa aatgattgat atggtgagtt tatttaaata gaggaggaga 1500
tttattggtt gtggtggtgg gagttgtttt gttgaggttg gtgagtgtgg ttttaaggtg 1560
gttttggtgt ggttttgtta ttttttttttg tttttgagtg tgttgttttt ttgagtgttg 1620
ttgggagatt ggttggttgt gtgattgttg gaggggtatt gttgttaata aatttgtttt 1680
ggttggtttt ggagaaatta aaattaagat aaataaatta gttaaatggt tgggaatttg 1740
gggtggggtt tgaggtttgg ggtttggtgt tgtgttggtg ggtttgttgt ggtgtttaag 1800
ttttgatttt ttttttgttt tttgtttggg aagttgggat ttggattaga ggattgtgaa 1860
ggttgttggt agtttgttag gagttggggt ggtgagttgt ttttagtttg gtttttttta 1920
gtggttttta ttttgtggtt tgtgggggag gttgtggagt gtttgttggg ggggttgggt 1980
gtttttttgt tggtgtgttt ttgttggggg ttggtggagg tagtgggtaa tggtttgttt 2040
agttttaatt tagaagtttt tgttattttt ggggaggttg gggtttaggg gaagaagtta 2100
aagtgaatgt ttttttttta gaaattagtt aggagtagat gtggtattta ttatgaattt 2160
aagttttttt ttaatgaaaa taagaaagga atttaagatt aaaaaaaaaa aataaaaaat 2220
tttagttttt taagtttttt aataaatttt gtagttgttt tagatatgtt tagttttgaa 2280
aaatgagggt atatttttgg tttaggattt ttttttttaa gtatagttaa ggttatggat 2340
attggttgtg tgtgggaatt tgtttttttt tattttttg tttttttttg ggattgtagt 2400
agtttttttt atttgagttt agttgttaaa tataatagtt tttttttttt tttatttttt 2460
ttttttatta gattttattg ttttaataaa tttagaataa tatttagatg ttagtgaatg 2520
tttttagagg gttgaagggt gaaaatattt tttttggggt taaattttag atgatgaaat 2580
gatttttaaa atattataat tatgttttaa tgtttgatat tagtatttta gtgttttttt 2640
tttttttttt gtagttggaa attttttttt tagtgtgggt ttgagtattg tggtggaagg 2700
taaagtagga tgatgagtag ggttgttttg agataaagtt tagtggattt ttaattgttt 2760
ttttattttt atgtttggta tttattattt tggtttgagt taaagttaat gtattttatt 2820
ggaaattaat tttttgtttt aatattatat agtagtaaag tttttttaag tatttatgtt 2880
atagatgagt ttgatgtgta gtttgttttt ttagttatat tttgtttatt ttgtgtgttt 2940
attttatttt atatgtttta gaatgtgata gttggaaggg attttt 2986

<210> 60
<211> 5666
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 60

aaaattagaa tttttatttt tttgtgtttg ttatattttt tagtgttgtt taattttttt 60
ttgtaagtga gggtggtgga gggtgtttat aatttttta gggagtaagt tttttttggt 120
tttttttttt tttttttttt tttttttttt tgagattaag ttttgttttt gtttttttagg 180
ttggagtgta atggtgtgat tttggtttat tgtaattttt gttttttttt gggtttaagt 240
gatttttttta tattagtttt tgagtagttg ggattatagg tatgtgttat taagttttgt 300
taattttgta tttttagta gagatagggt tttgttatgt tggttaggtt tgttttgaat 360
ttttggtttt aggtgatttg tttgttttgg tttttttagaa tgttgggatt atagatgtga 420
gttattgtat ttggattttt tttttatgta atagtgataa ttttatttaa agtatttttt 480
tttttttttg agttggagtt ttatttgtt atttaggttg gagggtggtg gtgtgatttt 540
ggtttattgt aatttttgtt ttttgggttt aagtgatttt tttgttttag tttttttgagt 600
agttggaatt atatatgtgt gttattatgg ttagttaatt tttgtatttt tagtagagat 660
ggggtgttat tattttggtt aagttggttt tgaattttg atttaggtg atttgtttgt 720
tttggttttt taaagtgttg ggattatagg tgtgagttat tgtgttttgt tttaaagtat 780
ttttttttta tgttttaaaa taagattgta agttagtttt taaagtggat aatttaagag 840
ttaataggta ttagtttagg atgtgtggta ttgtttttaa ggtttatatg tattaatata 900
ttatttaaat ttataataat ttttataaag taggggggtat ttatattttt tttttttttt 960
ataattatga aaaatgtaag gtatttttag taggaaagag aaatgtgaga agtgtgaagg 1020
agataggata gtatttgaag ttggtttttg gattattgtg taattttgtt tttagaatat 1080

```
tgagtatttt ttttggttta ggaattatga ttttgagaat ggagtttgtt tttttaatga    1140
tttttttttt atttttttat ttgtttatag gtagaatttt tttttgtttg tattaaataa    1200
attttatttt tttagagttt gtttttatat taggtaatgt atatgtttga gaaatttttg    1260
ttttagatag ttgttttata tgtaggaggg gaaggggagg ggaaggagag agtagtttga    1320
tttttttaaaa ggaatttttt gaattagggt ttttgattta gtgaattttg tgtttttgaa    1380
aattaagggt tgagggggta gggggatatt ttttagttgt ataggtgatt ttgatttttg    1440
gtgggggtttt tataattagg aaagaatagt tttgtttttt ttttatgatta aaagaagaag    1500
ttatattttt tttatgatat taaatatttt gatttaattt ggtagttagg aaggttgtat    1560
tgtggaggaa ggaaatgggg tgggggtgga ttttttttta atagagtgaa tgtatttaaa    1620
tatgtttttg ttggtaggtg ggggagtgtg gttgggagta gggaggttgg agggtggtgt    1680
gggggggtagg tggggaggag tttagttttt tttttttgtt aatgttggtt ttggtgaggg    1740
ttgtttttgg ttggtgtttt tgggggagat ttaatttggg gtgattttag gggtgttata    1800
tttgttaagt gtttggagtt aatagtattt tttttgagta tttgtttatg gtgttttttt    1860
gtttggaaag atattgtggt ttttttagag gatttgaggg atagggttgg aggggggtttt    1920
tttgttagta ttggaggaag aaagaggagg ggttggttgg ttattagagg gtgggggtgga    1980
ttgtgtgtgt ttggtggttg tggagagggg gagagtaggt agtgggtggt ggggagtagt    2040
atggagttgg tggtggggag tagtatggag tttttggttg attggttggt tatggttgtg    2100
gtttggggtt gggtagagga ggtgtgggtg ttgttggagg tgggggtgtt gtttaatgta    2160
ttgaatagtt atggttggag gttgatttag gtgggtagag ggtttgtagt gggagtaggg    2220
gatggtgggt gattttggag gatgaagttt gtaggggaat tggaattagg tagtgttttg    2280
atttttttgga aaaaggggag gtttttttggg gagtttttag aaggggtttg taattataga    2340
tttttttttg gtgatgtttt gggggtttgg gaagttaagg aagaggaatg aggagttatg    2400
tgtgtataga tttttttgaat gttgagaaga tttgaagggg ggaatatatt tgtattagat    2460
ggaagtatgt ttttttattag atataaaatt tatgaatgtt tgggataaaa agggagtttt    2520
aaagaaatgt aagatgtgtt gggattattt agtttttaat ttatagatat ttggatggag    2580
tttatttttt ttattaggag ggattattag tggaaatttg tggtgtatgt tggaataaat    2640
attgaatata aattttgatt gaaattattt agaagtggtt gggtgtggtg ttttatgttt    2700
tgtaattttt ttattttggg agattaaggt gggggggaatt atttgaggtt gggagtttga    2760
gattagtttg gttaataggt gaaattttgt ttttattaaa aatataaaaa gtagttgggg    2820
gtggtggtag gtgtttgtaa ttttagttat ttgggaggtt gaggtaggag aattgtttga    2880
atttgggagg ttgaggttgt agtgaatagt gagatggagt tattttattt tagtttgggt    2940
gatagagtga gattttgttg aaagaaagaa agagagaaag agagagagaa aaattattta    3000
gaagtaatta tatattgtgt ttatttttaa ttgagtaggg taaataaata tatgtttgtt    3060
gtaggaattt aggaaataat gagttatatt tatgtgatta ttttagaggt aatatgtagt    3120
tattattttg ggaatatttg ttaatatttt tgtttttttta ttatttttag tttatttgat    3180
atagtttatt tgtgataaga gtttttaatt ttttattttt gaatagaggt gttttttttt    3240
tttttatttt tgttttgtga gggagttagg ggaggattta aaagtaatta atatatgggt    3300
aatttagtat ttttaaaatt ttgttaatag tttgaatttg ggagtttggt tttgtagttt    3360
tataatattt tagaagagat tttatttgtt taaaaataaa aaggaaaaag aaaagtggat    3420
agttttgata atttttaatg gagaagggag aagaatatgt agaaaagggg aaatgatgtt    3480
ggtttagaat tttaattata ttggtgttta atataggaat atttatttat ataatatttt    3540
aaagtattaa atttatatta gtatattatt aaatggatat attattaaat gggtttaagt    3600
attttatata ttttaattta attgatttat ttttttttttg ttttggattt ttattatgat    3660
ttaaatattt atatatgggt tatttttttag atttttttata ttatgaaata taagaaaaat    3720
ttttaaggtt agttttatga ttaagatgaa ggattttatt gaatatataa aataataaat    3780
atattgtaat attttgtttt tttttttgta gttgtaattt ggtttgttta tatttttttt    3840
ttgttttttt gaaaattgag ttagttttat tttttttagga taggatttaa taattataat    3900
ataatttagt ataatttttt gatttaggta aattatgtaa tttgtgttta gtatgaaatg    3960
tatttaaaaa taagtaattt tttttttaata ttattatttt taaattaata taataaataa    4020
tagttatttt aaaataaatt gtttattttt attatgtagt atttaaattt taaggttgtt    4080
atgattgtag atagtatttt aaaatttttt tttggaaatg gttttgtttt taagatgatt    4140
taggaattaa agaggtgatt atttttttgtt taatgaattt ttaaattata aatttgggaa    4200
gtgttttagt tttttattgt tgttgttata aattattata aatgtgttag ttaaaataaa    4260
tataaaatta ttattttata gttttagaga ttagaagtta aaaatgggtt tataaggttt    4320
tatttttttt ggaaatttta aggggtaatt tgtttttttg tttttttttag tttttagtga    4380
ttattaaatt ttttggttta tggtttttgt attttttttg tggtttgtgt ttttattttt    4440
gtattttttt tttgattgtg atttttttaat aaaaatattt ggggttatgt tgggtttatt    4500
ttgaaaattt tggataattt tttttaagat tattaattaa attatatttg taaagttttt    4560
tttgttatat aagttaatgt attaaaagtt tttgaggatt aggatataga tattgggggt    4620
ggggggggtat tatttagttt attataggaa ggaattttag ggttaattaa attagttttt    4680
ttattttata tttgaagaaa ttgaagtttt ggaattggag agtattatgt taaatgaaat    4740
aagttaaata tagaaagata aatattatat gtttttattt atttgtgaaa tataaaataa    4800
ttatattttt agtagtaaag agtagaatgg tggttattag agttgggggg tgggaggaat    4860
```

```
ggggagatgg taattaagat ataaagtttt agttaagatg ggaggaataa gtttgattgt   4920
tttttttgag atgtgtttta tagtatgatg aatatagtta aatagtaaat tttaaatgtt   4980
tttatttgat aaaaatgtta aatatttgag atgatggata ggttatttag tttgatttaa   5040
taatttttta ttgtgtttaa agattataat tttatattgt attatataaa tatatataat   5100
tgtattattt taatatataa ttttaaaatt aatataatga aaaagaaatt gaagtttaat   5160
atttttagaa gttaagtgta atttaaaagt tttgtgagaa tttgttttaa taaataaata   5220
agtttttttt ttttaataat tattatattt tgtgtttgga tatatagtag tgaataaaaa   5280
aaaaaaaaaa aaaaaaaatt tttaggttta atataatttt aggaagaaat tttagtagtt   5340
gtattttagg ggaaatatag gaagttagtt tggagtaaaa gttagtttgt ttttgttttt   5400
ttgttatttt gtttgtgttt tatagtgttt tttgtttgtg atgatagttt tgtagaagtt   5460
tggaggatat aatggaattt attgtgtatt gaagaatgga tagagaattt aagaaggaaa   5520
ttggaaattg gaagtaaatg taggggtaat tagatatttg gggtttgtgt gggggtttgt   5580
ttggtggtga gggggtttta tataagtttt ttttttgtta tgttggtttt tattttggtt   5640
ttgattattt tgtttttttt ggtagg                                          5666
```

<210> 61
<211> 5666
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 61

```
tttgttagag agaatagaat ggttagagtt agggtggggg ttggtatgat ggaaaggaag     60
tttgtgtaga gttttttttat tgttaagtag atttttatat aagttttagg tgtttaatta    120
tttttatatt tgtttttagt ttttaatttt tttttgagt tttttattta tttttttagta    180
tataatgaat tttattatat tttttgaatt tttgtggagt tgttgttata ggtagagagt    240
attgtgaggt atgggtaaaa tagtaaaggg gtagggatag attgattttt attttaggtt    300
aatttttttgt atttttttttg agatataatt attgaaattt tttttgaaa ttatgttagg    360
tttggagatt tttttttttt ttttttttt tgtttattgt tgtatattta agtgtagaat    420
gtggtaattg ttaaaaagag aaaatttgtt tgtttgttaa aataaatttt tataaaattt    480
ttaagttata tttagttttt gggaatgttg aattttaatt ttttttttat tatattagtt    540
ttaaaattat atattgggat agtatagttg tatatattta tgtggtataa tatgaagtta    600
tgatttttga atataatggg gaattattaa gttaagttaa gtaatttatt tattatttta    660
aatatttgat atttttgtta aatgagagta tttgggattt attatttagt tatatttatt    720
atgttatgaa atatatttta aaaaaaataa ttaaatttat ttttttttatt ttaattgagg    780
ttttatattt tgattattat ttttttattt tttttatttt ttagttttag taattattat    840
tttatttttt attgttaaga atgtaattgt tttatatttt atagataagt gagaatatgt    900
gatatttgtt tttttgtgtt tggtttattt tatttagtat aatgtttttt aattttaaaa    960
ttttaatttt tttaagtata aaataagaag gttagtttaa ttaattttaa aattttttttt   1020
tgtggtaggt tgaataatgt ttttttattt ttaatgttta tgttttaatt tttaaaaatt   1080
tttaatatat taatttatgt ggtaaaagag gttttgtaga tgtgatttaa ttaatggttt   1140
tgagggagat tatttagaat ttttagggtg ggtttaatat aattttaagt gtttttatta   1200
gagggttata gttagagaga agatataaga atggaagtat aggttataga gaaaatatag   1260
agattatgag ttaaggaatt tgatggttat tagaagttgg aaaagataag gaaatagatt   1320
gtttttttaga gtttttaaaa ggaatgaaat tttgtggatt tatttttgat ttttgatttt   1380
tagaattgta aaataataat tttgtgtttg ttttagttaa tatatttgtg ataatttgta   1440
atagtagtag taggaaatta aaatattttt taggtttatg atttgagagt ttattaaata   1500
agagatggtt atttttttgg tttttaaatt attttggaaa taaagttatt tttagagagg   1560
aattttaaaa tattgtttgt agttatagta attttaaaat ttgagtgttg tatggtggaa   1620
gtagataatt tattttagga taattgttat ttgttatatt agtttgagga tggtggtgtt   1680
aaagaggagt tatttatttt taggtatatt ttatattaaa tataaattgt ataatttgtt   1740
taaattaagg aattatatta aattatatta tggttattaa attttgtttt gagaaagtga   1800
aattgattta gtttttaaag agataaagag aaagtataag taaattaaat tgtagttata   1860
aaaagaaaga taaaatgttg tagtatattt attgttttgt gtatttaatg aagttttttg   1920
ttttggttat aaaattagtt ttaaaggttt tttttatatt ttatagtatg aaaaatttaa   1980
aaagtaattt atatgtaaat atttaaatta tgatagaaat ttaaagtaaa aagaaaatga   2040
attaattgaa ttaaaatgtg taggatgttt aaatttattt gataatatat ttatttgata   2100
atatattaat atgaatttag tattttaaaa tgttatataa ataaatgttt ttatattaaa   2160
tattaatgta gttaggattt taagttaata ttattttttt ttttttatat gttttttttt    2220
ttttttttatt aaaaattgtt aaaattattt attttttttt tttttttttg tttttaaata   2280
```

```
aataaggttt tttttaagat attgtaggat tataaagtta aatttttggg tttaagttgt    2340
tggtaaaatt ttagagatgt taagttattt atgtattaat tatttttaaa ttttttttta    2400
atttttttat aaaataggag tagggagagg agaaatattt ttgtttaaaa atgaggaatt    2460
gaaaattttt attataaata aattatatta agtaagttaa agatagtaaa agagtaaaaa    2520
tgttagtaga tatttttaaa atggtaatta tatattattt ttggaatgat tatatgaatg    2580
tggtttatta tttttaagt ttttatagta aatatatatt tatttgtttt atttagttaa    2640
aaataaatat aatatgtagt tgtttttgaa taattttttt tttttttttt ttttttttt    2700
tttttttgat aaagttttat tttgttattt aggttggagt gaagtggttt tattttgttg    2760
tttattataa ttttagtttt ttgggtttaa gtgatttttt tgttttaatt ttttgagtag    2820
ttgggattat aggtgtttgt tattattttt ggttattttt tgtattttta gtagaggtga    2880
ggtttatttt gttggttagg ttggttttga atttttgatt ttaggtgatt tttttgtttt    2940
tgattttta aagtgaaggg attataaggt gtgaggtatt gtgtttggtt gtttttgaat    3000
aattttgatt aaaatttata tttgatattt attttaatat atattataga tttttattga    3060
taattttttt tagtaagaaa gataagtttt atttaggtat ttgtgaattg gaggttaagt    3120
agttttagta tattttatat tttttaaga ttttttttt attttaaatg tttgtaaatt    3180
ttgtatttga taaagagtat atttttattt aatataaata tgtttttttt tttagatttt    3240
tttagtattt gagagatttg tatgtgtgtg gtttttattt ttttttttt ggtttttaa    3300
gtttttaggg tgttgttagg aggaggtttg tgattataaa tttttttga aaatttttta    3360
ggaagttttt tttttttttg gagaattgaa gtgttatttg attttaattt ttttgtaaat    3420
tttgtttttt agagttgttt gttatttttt gtttttgttg tagattttttt atttatttgg    3480
attggttttt gattgtaatt atttggtgtg ttgggtagtg tttttgtttt tagtagtgtt    3540
tgtatttttt ttatttgatt ttgggttgtg gttgtggtta gttagttagt tgaaggtttt    3600
atgttgtttt ttgttgttgg ttttatgttg tttttgttg tttgttgttt gtttttttt    3660
tttttgtagt tgttgagtgt atgtggtttg ttttattttt tggtgattag ttagtttttt    3720
tttttttttt ttttggtgtt ggtggaagag tttttttga ttttgtttttt taaatttttt    3780
ggagggattg tggtattttt ttaggtaagg ggatgttgtg agtgagtgtt tggaggaggt    3840
gttattaatt ttgagtattt agtgaatgtg gtatttttga agttgtttta ggttgggttt    3900
tttttggggg tattagttgg aagtagtttt tgttagagtt agtgttggta aggaaggagg    3960
attgggtttt tttttatttg tttttatat tgttttttgg tttttttgtt tttagttgtg    4020
tttttttgtt tgttagtaaa ggtgtgtttg agtgtgttta ttttgttaaa aagaaatttg    4080
tttttgtttt gtttttttt tttgtgatat aattttttta attgttaaat tgaattgggg    4140
tgtttggtgt tatagggaaa gtatggtttt ttttttaat tataagaaaa agtaaaatta    4200
ttttttttta gttgtgagag ttttattgag aattgaaatt atttgtatga ttagaaagtg    4260
tttttttatt tttttaattt ttgattttta ggagtgtggg gtttattaag ttagaaattt    4320
tagtttaaag gatttttttt ggagagttgg attgtttttt tttttttttt ttttttttt    4380
tttgtgtgta aaatggttgt ttggggtaag ggtttttttag atgtgtatat tgtttggtat    4440
aagagtagat tttgaaaaga tgaggtttat ttaatatgga tgggggagaa ttttgtttgt    4500
aggtagatag gaaaatgggg agggagttat tggaaggatg gattttattt ttaaagttat    4560
aatttttaga ttagaaaaag tgtttagtgt tttagaagta gagttgtata gtgatttaaa    4620
gattagtttt aaatattgtt ttgttttttt tatatttttt atattttttt ttttttattga    4680
aaatatttg tatttttgt aattataaag ggggaaggga atatgagtgt tttttgtttt    4740
ataggggttg ttgtgagttt aaatgatgta ttaatatata taagttttaa gaatagtgtt    4800
atatatttta agttaatatt tgttagtttt tgaattattt gttttgagga ttggtttgta    4860
attttgtttt gaggtataga aagaaaatgt tttggagtag gatgtggtgg tttatatttg    4920
taattttagt attttgggaa gttgaggtgg gtagattatt tgaggttagg agtttgaggt    4980
tagtttggtt aaaatggtga tattttgttt ttattaaaaa tataaaaatt agttggttat    5040
ggtggtgtat gtgtgtaatt ttagttattt aggaggttga ggtaggagaa ttgtttgaat    5100
ttgggaggta gaggttgtag taagttgaga ttgtgttatt attttttagt ttgggtgata    5160
gaatgagatt ttgatttaaa aaaaaaaaaa aatgttttgg atagaattat tattattata    5220
taaaaggaaa gtttggatgt ggtggtttat gtttataatt ttagtatttt gggaggttga    5280
gataggtgga ttatttgagg ttaggagttt gagataagtt tgattaatat ggtgaaattt    5340
tgtttttatt aaaaaatata aaattagtgg ggtttggtgg tgtatgtttg taattttagt    5400
tatttggagg ttgatgtagg agaattgttt gaatttagga gaaggtggag gttgtagtga    5460
gttgagattg tgttattgta ttttagtttg ggagataaga gtgaaatttg gttttaagaa    5520
aaaaagaaag aaagaaagaa agaaagatta agaagaattt attttttgaa aagattatgg    5580
gtatttttta ttatttttat ttataaagaa aagttaaata gtattaaaga gtataataag    5640
tgtaaggagg taaaagtttt aatttt                                          5666
```

<210> 62
<211> 5085
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 62

```
tgatggttgt ataattttga gtatatgaaa aattaatgaa ttgatatttt gagtgagttg      60
tatgatattg gaattatatt ttaataaagt atggtaattg ttttaagata ggttggaaag     120
agaaagtttg aaaataataa taatgatatt aataaattag tttatttttt tagttttata     180
tatttttgtg tttatatttg tttttgtttt atttataatg gttttttttgt agttgttata     240
ttatatttg ttatttgatg tttggtgaat atttatatt tgttttttag aattttttt     300
atttttttt tatttgttta attttatat atttaaaatt aattagagta aattatttat     360
tagaataatt aattttaaat tttagtaatt taatatgata aaggtttgtt ttttatttat     420
atagtttttt tttagatgat tgaggggttt aggtttttta tttttagtgg tttttttatt     480
ttttggagtt ttttgtattt tttatatatg gttgagataa attatgagtt attagtatag     540
ttagattttg aggttttata agaaaatttg taaattattt attttgtttt gaataaggta     600
tatttaagat gatgttaaaa tatttaatgg ttttgggtta aatatagttt atgattgtgt     660
atttaaaata tatattgtaa tatttttttt ttttttatt gattttatga atttagtggg     720
gatttatttt ataagtttaa agataattat tttttagatt aagaatattt agggtaaaaa     780
gtattgttta atatttttat tgaggatgtt atgatgtagt atattgtata agttggagtt     840
aaaggaaatt ttttttaaag tgttatttat taaaaattgg aatatatttt ttaagataaa     900
ttgaagtgtg gtatataata tttaaatttt tattatagat atagaggtgt tattattttt     960
tatttttaaa ttttttgtt atgttgagga tatttaagag gagtaggata tgttggttgt    1020
agtaggagaa atttgaaagt atttattttt atggaattta taagggagag aatttttttat    1080
tttagtattg tttttgatat atttattatt ttaaaagata atgtagttaa atgttttttt    1140
ttgtgttaaa tttttataaa attgaaattt taaaatggtg ataaaaattt tatttttgat    1200
agaatttatt tattttttta attagatagg gtataatttt taatttgtaa aataaaatgt    1260
aatatgttta tgaggtttta ttttaaagaa tttgttattg agagtagtat ttagaataat    1320
gggtggaaat gttaatttta gagttttaga ttttattggt aattggggta gggaggggtt    1380
ttgggtgggg ttttttttaga ggaggaggtg ttgttagaaa gttgtttggt tagtttatag    1440
ttgttattaa ttggggtaag ttttgttgta tttgtgtgtg tgggtggtat ttttaatgag    1500
aattagtttt atttgttatt tgagtgaaat ttataatttg aggtggttag tgtttttgta    1560
ttattgggat ttgagatttt tggagatgat tgttgtttgt agtatggagt tagtagaagt    1620
ttgatttttt ttgggaatgg gttgtattga gaggtttgat tagttttagg gttttagtga    1680
gggggtagtg gaatttagtg agggattgag agttttatag tatgtatgag tttgatgtta    1740
gagaaaaagt tgggagataa aggagttgtg tgttattaaa ttgttgttgt agttgtagtt    1800
atttaagtgt tggatttgtg agtattttgt gtttttagtt tttggataga agttggagaa    1860
tttttttgga gaatttttttg agttaggaga tgagattttt taataattat tattttttttt    1920
tgtgtttttt atttgttgtt tgttgggata aatgatagtt atagtttttt tgatgatagg    1980
atggaggtta agggtaggag ttgattagtg ttgttttttt ttgtttttga tttaggaggt    2040
ggagattttt ttggtttagt tatatttaat atttattttt ttttttttt gtttttatat    2100
ttttgaaatt ttttttttt ttttttttt ttttttttg gagatggggg aggagaaaag    2160
gggagtttag ttgttatgat tgagttgaag gtaaagggtt tttgggtttt ttatgtggtg    2220
ggtggtttgt ttttttttga ggttggattt ttattgttgt gttgtttagt tgtaggtttg    2280
tttttgggga gttagatttt ggatattttg tttgaagttt tggttatatt tatttttttg    2340
gatgggttat tttttttttg gttttgttag ggataggatt tttttgatga aaagatgtag    2400
gattagtagt tgttgttgga tgtggagggt gtatatttta gagttgaagt tataaggggt    2460
gttggaggta gtagttttag ttttttagaa aaggatagtg gattgttgga tagtgttttg    2520
gatattttgt tggtgttttt aggtttgggg tagagttaat ttagtttttt tgtttgtgag    2580
gttattagtt tttggtgttt gtttggtttt gaatttttttg aagatttatt ggttgttttt    2640
gttatttagt gggtgttgtt tttgtttatg agttggtttg ggtgtaaggt tggagatagt    2700
tttgggatgg tagttgttta taaagtgttg ttttggggtt tgttattagt ttggtagttg    2760
ttgtttttgg tttttgagag tttttattgg tttggggttt tagtgaagtt gtttttgtag    2820
gttgttgtgg tggaggttga ggaggaggat ggttttgagt ttgaggagtt tgtgggtttg    2880
tttttgaagg gtaaattttg ggttttgggt ggtgtggtgg ttggaggagg agttgtggtt    2940
gttttgttgg ggtggtagta ggaggtgttg ttttggtttt taaggaagat ttttgttttt    3000
tagtgtttag ggttgttttg gtggagtagg atgtgttgat tgtttgggat gtttttgttg    3060
gttattatgg tgatggattt tatttatgtg tttattttgt tttttaatta tgttttattg    3120
gtagtttgta tttggtagtt gttggaagat gaaagttatg atggtggggt tggggttgtt    3180
agtgttttttg ttttgttgtg gagtttattt tgtgttttgt ttattttggt tgttgtaggt    3240
gatttttttg attgtgtgta tttgtttgat gttgagttta aggatgatgt gtattttttt    3300
tatagtgatt tttagttgtt tgttttaaag ataaaggagg aggaggaagg tgtggaggtt    3360
tttgtgtgtt ttttgtgttt ttattttgtg gttggtgtta atttgtagt tttttttggat    3420
tttttgttgg ggttattgtt tttgttgttg ttgtgagtga ttttatttag atttggggaa    3480
```

gtggtggtga tggttgtatt tgttagtgtt ttagttttgt ttgtgttttt tttggggttg 3540
attttggagt gtattttgta taaagtggag ggtgtgttgt tttagtaggg tttgtttgtg 3600
ttgttgtttt gtaaggtgtt gggtgtgagt ggttgtttgt ttttgtggga tggtttgttt 3660
tttatttttg tttttgttgt tgttgttggg gtggtttttg tgttttattt tgtatttggt 3720
tttaatgggt ttttgtagtt tggttattag gttgttgtgt ttaaggaggg tttgttgtag 3780
gtttatttgt tttattttaa ttatttgagg tgagggtttg ggatggggta tgtttagtgt 3840
gtttgggagt agtggttttg ttggtggtgg tggttgttaa tttttagttt tagttttagt 3900
gtattgttgt gtttttttggg gtggttggag agggtgggta gtgggatata gtataggggt 3960
agttgttttt tttttttttt tttttttttt ttatttttgg ggatatgaag gtgggtgtag 4020
aatatattat ttttggggtg tgtttttttg aaagttgttt ttttgtttgt tttttaattt 4080
tttgaatttt ttagattttg aagtagaatt aattttgatt taaaatgtgt agtgttatat 4140
taggtttgtt gtagtttagt ggggtagaaa gtgtgtggtg agttgggggt tttatgaaat 4200
gttttttttt tagaagaagg atgtttatta ggagtgtttg ttttggagag gagttaaggt 4260
attgtttttt tgggaggggt gggatttgag aggtggttgg ttagaattga aagtagtatt 4320
attttaggga tttgaatatt ttagtggttt agttttttta agaattttaa gattaaaatt 4380
aagtttatgt gggaaatgtt taaattgtgg atttaaatgt ttgttattgt attgtattgt 4440
tttttttatta ttgtttgtta tttattataa ttttttttat atataggttt aaaaaatatt 4500
attttgtata ttgaagtaat ggaatgtaaa aaaagaatgt tttgtttgga attttatgtt 4560
gtgaataggt aaaatagtgt tagtgtattg gataatattt taaaatgata aatatatatt 4620
tgtttaagta agtaatgatt atagggttgt gttttaaaaa tttaaaatta aaatattgta 4680
aagtattatt gaatttttaa agttaaatta tatttgtttt gatttagtat atagatagga 4740
aggatataat attttatttg ttaaagatta aattgttttt atataaagag ttttgtagaa 4800
agattttttt ttaattgatt ttaatttttt aggatataat attatatatt aattattgtt 4860
tttttatatt ggtgttattg atgaatggtt aattatttgt aagtatggtg aatttagtta 4920
tggatagttt attattaagt ttagtttgta tgttttttaa gtgtatatat atagttttgt 4980
ttttaaaatt tttttttatt ttgttaatat tggtttaaga aatttttagt attagatagt 5040
ggtgtattta aaaataaatg gagtattttg ttttgtattt taagg 5085

<210> 63
<211> 5085
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 63

ttttgaaatg taaaataaag tattttattt atttttaagt gtattattat ttaatattaa 60
aggtttttta aattagtatt aatagggtga aaggagattt taaaaataga attgtatata 120
tatatttgaa agatatgtaa attaaatttg gtaatagatt atttgtaatt ggatttatta 180
tatttgtaaa tgattagtta tttattagta gtattaatat aaaagaataa taattagtgt 240
ataatattat gttttagaaa gttaaagttg gttaaaagga aatttttttta taaaattttt 300
tatatagaaa taatttagtt tttgataaat gaaatgttat gttttttttg tttgtatgtt 360
gggttaaaat aaatatggtt tggttttaaa agtttgatgg tattttgtaa tgttttggtt 420
ttgagttttt aaaatataat tttgtaatta ttgtttattt aagtaagtat atgtttgtta 480
ttttaaagta ttgtttaata tattgatatt gttttgttta tttataatat aagattttaa 540
atagagtatt tttttttttat atttttattat tttagtatgt aaagtagtgt tttttaaatt 600
tgtatataaa aaaaattgta gtgaatagta agtaataata agaaaatggt gtaatgtagt 660
gataggtgtt taaatttata gtttaaatat tttttatgtg aatttaattt taattttgag 720
atttttaaga aaattgagtt attgaagtgt ttaaattttt aagatggtgt tgttttttggt 780
tttggttggt tattttttaa gttttatttt ttttgggggga atggtgtttt aattttttttt 840
taagataagt atttttggta aatgtttttt ttttaagaaa gaagtatttt ataaagtttt 900
taatttgttg tgtatttttt gttttattgg gttatagtgg atttagtgtg atgttgtatg 960
ttttaaattg ggttggttt tgttttggaa tttggaagat ttggaaagtt aaaaaataaa 1020
taaaaaaata gtttttaggg aggtatgttt taaaaatagt atattttgtg tttatttttg 1080
tgtttttaag agtgaggaga ggagggaaga agaagggagg taattgtttt tgtgttgtgt 1140
tttgttgttt atttttttttg gttgttttgg ggagtgtagt ggtgtgttgg ggttggggtt 1200
gagggttggt ggttgttgtt gttaatggaa ttgttatttt tggatgtgtt gggtgtgttt 1260
tgttttgggt ttttatttta ggtagttgag atagggtggg tagatttgtg gtaggttttt 1320
tttgagtatg gtggtttggt agttgagttg tgggagtttg ttgaggttga gtgtagggta 1380
gagtgtgggg gttgttttgg tggtggtggt agaggtggag gtggagggta ggttgttttg 1440
tgggagtagg tagttgtttg tgtttggtgt tttgtagggt ggtggtgtga atgggttttg 1500

ttggggtggt gtgtttttg ttttgtatag gatgtatttt agggttgatt ttgaggagga 1560
tgtagatgag attgaggtat tggtgggtgt ggttgttatt gttgtttttt tgggtttgga 1620
tggggttgtt tgtggtggta gtgggggtgg tggttttaat gggaaatttg ggaaggttgt 1680
ggggttggta ttggttataa ggtaggaatg tggggagtgt gtggaggttt ttgtgttttt 1740
tttttttttt tttattttta gagtgggtgg ttggaagttg ttatagagag ggtatgtgtt 1800
gtttttgggt ttggtgttgg gtgggtatgt gtagttgggg aagttgttta tagtgattgg 1860
ggtggatgag gtatagggtg aattttgtgg tggggtaaag gtgttggtag ttttggtttt 1920
gttgttgtaa tttttgtttt ttagtagttg ttgagtgtgg gttgttaata aggtgtgatt 1980
gagaggtagg ataggtatgt ggatgaaatt tattattgtg gtggttagtg gggatgtttt 2040
ggatgattgg tgtgttttgt tttattaggg tgattttggg tgttgagaag tgggaatttt 2100
ttttggggat tagggtgatg tttttttgttg ttgttttggt gggatagttg tggttttttt 2160
tttagttgtt gtgttattta gagtttgagg tttgtttttt agaagtggat ttgtagattt 2220
tttggattta gagttatttt ttttttttaat ttttattgta gtggtttgtg gagatggttt 2280
tattggggtt ttggattagt gagggttttt agaggttggg agtagtagtt gttgggttgg 2340
tgataggttt tggggtagta ttttatgggt agttgttgtt ttggagttgt ttttaatttt 2400
gtatttggat tggtttatga gtggggataa tatttgttgg gtggtggggg tagttggtgg 2460
atttttggga agtttggggt taaataggta ttaagagttg gtgattttgt aggtgggagg 2520
gttgggttgg ttttgtttgg gatttgaggg tgttaataga gtgtttaaga tattgtttag 2580
tagtttgttg tttttttttg ggggattaga attgttgttt ttagtatttt ttgtagtttt 2640
agttttggaa tatgtgtttt ttatgtttga tagtgattgt tggttttgtg ttttttttgtt 2700
ggaggggttt tgtttttggt agggttgagg gaagagtagt ttgtttaggg agataggtat 2760
ggttgaaatt ttaggtaagg tgtttgaggt ttggtttttt gggaatggat ttgtggttgg 2820
gtgatatagt agtggggatt tgattttggg ggagggtggg ttgtttgtta tgtggggagt 2880
ttggggattt tttgttttta gtttagttat gatgattgga tttttttttt tttttttttt 2940
gtttttaggg aggagggaaa agggaaggag gaggggggttt tgggaatata ggggtagagg 3000
gaggagaaag tgggtgttga atgtggttgg attggaggga tttttatttt ttgggttggg 3060
ggtgggggag ggtggtgttg gttagttttt gtttttggtt tttattttgt tgttagggga 3120
attgtggttg ttgtttgttt tagtgagtgg taagtgggga gtgtaagaaa aagtagtaat 3180
tgttaggaga ttttgttttt taatttgggg agtttttttaa gagagttttt taatttttgt 3240
ttgaggattg gagatgtaga gtatttataa gtttggtatt tgagtggttg tggttgtgat 3300
ggtaatttag tgatatgtgg tttttttatt ttttgatttt ttttttggta ttaaatttgt 3360
gtatgttgtg aagtttttag tttttttgttg agttttattg ttttttttatt aaaatttgg 3420
ggttagttgg atttttttggt atagtttatt tttaggaagg gttggatttt tgttggtttt 3480
gtattgtggg tgatagttat ttttgaagat tttagatttt agtagtgtgg gagtattagt 3540
tgttttgggt tgtagatttt atttaaatga taagtgaagt tagtttttat tgagaatgtt 3600
atttatatgt ataaatataa taaggtttat tttgattagt gatagttgtg gattggttag 3660
atagtttttt aataatgttt ttttttttttag ggaggttttg tttaaagttt tttttttattt 3720
taattattgg taggatttga aattttggag ttggtatttt tatttgttat tttgaatgtt 3780
atttttaata gtaggttttt tgggatggaa ttttataagt atattatgtt ttgttttgta 3840
aattaagaat tatgttttat ttaattggaa aaatgaatag attttattag aagtagaatt 3900
tttgttatta ttttaagatt ttagttttgt aaagatttaa tatagaggaa gatatttggt 3960
tatattattt tttaaaataa taaatgtatt aaggatgata ttaaaataag aaattttttt 4020
ttttatgagt tttataaaag tgaatgtttt taagtttttt ttgttgtgat taatatgttt 4080
tgtttttttt gagtattttt agtgtgataa agaaatttgg gagtgggaga tggtaatatt 4140
tttgtattta tgatggaagt ttggatgttg tgtgttatat tttgatttgt tttaaggaat 4200
gtgttttaat ttttagtaaa tagtatttta aggaaagttt tttttagttt tagtttatat 4260
agtgtgttat attataatat ttttagtaga gatgttgaat agtatttttt attttaaata 4320
tttttagttt gaaaagtaat tatttttgag tttataaaat ggatttttgt taaatttatg 4380
aagttagtag aaaaagggaa gaatattgta atatatattt tagatatata gttataaatt 4440
gtatttgatt taagattatt gggtatttta atattatttt aaatatattt tgtttaaaat 4500
agagtgaatg atttgtaaat ttttttgtag gattttaagg tttagttgtg ttaatgattt 4560
atagtttatt ttaattatgt ataaagaatg tagaagattt tagaaggtgg gggagttatt 4620
agaggtaagg agtttggatt ttttgattat ttggggaggg gttatatgag tgagaaataa 4680
atttttatta tgttaggtta ttaggatttg gagttggttg ttttagtaaa tagtttattt 4740
tgattaattt tagatatgtg gaagttaggt agatagagga aaggtaaaga gaattttggg 4800
aagtaggtat agaatgttta ttgggtatta aatggtagga tataatatgg taattgtaag 4860
gggattatta tgaatagaat aggagtaagt gtgggtatag aagtatatga gattagagaa 4920
gtaaattaat ttattaatat tattattgtt gtttttaggt tttttttttt tagtttattt 4980
taaaatagtt attatgtttt attgaggtgt aattttagta ttatatagtt tatttaaagt 5040
attagtttat tgattttttta tgtatttaga gttgtgtaat tatta 5085

<210> 64
<211> 8222

<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 64

```
aagattagat gtaattttgt taagtagtta ttttgtaaat tgtatagttt tatgtagatg     60
gaaggaaggg tttgtgttta ttttgattat agtattaaat aaattgtatt gtatttttat    120
tttttttagt tattttttta aaaagatttt gagtttttttg aatataggaa ggtgttttat    180
ttgattttgt tatttttagt atgtagtagt gtttgatata tagtaggtgt tttattattg    240
tgagagggat ggatggatgg gtggagttat agatggatag aaggatagat ggagggatgg    300
gtggatgatg gatggataga tggatggagg ggggatgatg aatggaggga taatgagtgg    360
atgaatgagg gaatgggtgg atggatggat ggagggatgg aggaatagat agatagatgg    420
agggatgggt gggtgatgga tggatagatg gatggaggga gggatgatga atggagggat    480
aatgaatgga tgaatgaggg gatgggtgga tggatgaatg gagggatgat gggtggatga    540
atgaattgag ggatggatgg atgaatatat ggatggatgg atagatggat agatggagga    600
attggtggat tttggatgga tgggtggatg gatagatgaa tgaatgtttg gatagataaa    660
gagatgatgg atagatgaat agatgaatta agggatgttg gatagatgga gggattgata    720
gatgttggat ggatgggtgg tggatggata gatgagtgaa tgtatggata gataaagaga    780
tgatggatgg atgaattaag ggatgataga tggatggatg gatgagtaat tggatggata    840
agtggataaa tggatagatg gttgaatatt tgaatggatt gaaggaggat gtatggatgt    900
aagataaggt taattatttt ttattttttt tttttgtaaa attatttatt tatttattta    960
ataaatattt atttagttta aatttggtat aaagtattat gtgaggttta agagatatgt   1020
gggttaataa aatagagttt ttgttttttt gaaaattgta aagaaagggg tgtggttttt   1080
tgagtttaaa ttttaatttt gttagtgatt agttgtatat tagtgatgtt tttttatttt   1140
tttttaatta aatagggata atgttagtat ttattatatt gggaggtttt gtggggatta   1200
aatgagttat taaatgttaa gtgtttggga tagggtttgg tatttagtaa agtttttttgt   1260
gagtgttggt tgttattatt ttaatggaga agatggtatg aaaattagga aataggatgt   1320
tttttgggaa gtaatgtaat aggaatttat ataaagaaag gaaaggagga agtaattagt   1380
ggtgttttaa aggagtatgt taagaaaaat tttttagagg gaaatttttg agtagggtta   1440
tgaaaatagg agtttttttaa gagattgtgg atttgtttgg gattatttgg ttataagtat   1500
aaaattattt ggtttttttt tgttattttt ggttgggtga ggggttttttg gtaaaggggt   1560
agaaggtgtg tgagaggttg tgaatggtta ggattgtttt ggggttagtt ggggtatttg   1620
gtggttaagt ttagaaatat gataggtttt tttgggaggg ttgattgtag ggagtgttgg   1680
gttttaggtt gttggtgttg gtttttgtgg tgtttttttt gttggttatg agagtttaga   1740
tagtgtttaa ttttttttttt tttttttttat atgtataatt attttatttt ttgtggtttg   1800
agttgttttg ttttgttata atggtatttg ttttaaaata gttttttatg tgagggttag   1860
agaaaggaaa agattagatt tttttggat gagagagaga aagtgaagga gggtagggga   1920
gggggatagt gagttattga gtgattttg ttaagtattt tagaaggtat aaaaaatgttt   1980
ttgggattag gtagttttaa attttagttg ttggggttag gatatttagt gagtttatat   2040
ttgttttttt tgtttttttt agattgtgtt atggggttta gtgatgggga atggtagttg   2100
gtgttgaatg tttgggggaa ggtggaggtt gatattttag gttatgggta ggaagttttt   2160
attaggtaaa aggaagagat tttattgttt ttgttattta tattttaaga ttaagggtgt   2220
ttagttgtaa ggtggaaagt ttgtatgtgg ggtaggttag ttggttgtat tagttaaggg   2280
tgttagaatg gttatttgtt ttttttttgt ttttaagtgt tagggattgg atttaggaga   2340
gggaaaggag ttattttagg ttgatgttag tagttggagg aagtatgaga attaaattta   2400
ggatgtttag agtttattag gaagaatttt agaattatag atagttagag ttaataaggg   2460
ttttgagaga ttttgtatag ttattttttt tataggatga ggataaaaag ggattgagaa   2520
ggggaggata tttttagagt tatagtttat taaatgtttt taaagtgtta aggttaagat   2580
atgtttttta aggggagata gatttggttt tagatttggt tttgttattg agttattggg   2640
tgatttttgg gaaagtattt aatttttttgg agttttaatt ttttttttttg tatagtgagg   2700
ggatatttta atatttatat tttagaggag atgtgagaat taaataaaat aatgtatgta   2760
agaggtttgg tatggttttt ggtatatatt gagttttaga aatgttagta gttattattg   2820
atgaagttta ggttagggat tttttaaagt attgtaatta gagaatagaa gatagaggtt   2880
tattagtgat ttttgatgtt gagtatgttt ttagtttgag aggtttgaat gatgtggttt   2940
gtaagtatat tttgtttttt attataaggg atttttagaat atattaaaga aaataaaatt   3000
ttgaggtttg taaatagagg gtggttgtgg tttgtatata gaagtttatt tttttgttgt   3060
tttttatttt aaaggtgata tattttttttt ttggtttttt tttttattat tttgagttgg   3120
ttttttttaga agtttaatag gttaagaatt aatgtttttg ttaatgggag gaaggaagtg   3180
ggtgttgggg ttgttataag tgaatggatt gtttttggta ttttaatttg tagattaatt   3240
ttttttttatt tgtgagttag agttaatttt ttttttttat tttgttgttt tttgggtttt   3300
```

ttttgggttt tatttatttt tagtttttgt ttattttggg agtatggttg gttttggaag 3360
ttttgttatt taaaatttga gttgttggtg atttgtgtta gaaatatttg aggaagaaga 3420
gttgagtttt ttgttgattg taatggtatt gtagtgtgtt tatgtttttt tttttttgtt 3480
tttgttattt ggttgtaata ggttttgttg gattgtataa agtgtttttt tgattaatat 3540
atatatataa attgatatta atttttgggt tatagatatg ttatgtgatt ttggataagt 3600
tttttttattt ttgggtttta tttttttgtt ggttgagtga agggattgtt ttttatggtt 3660
tttgagattt tgttttatgt ttatgtttta gaatttttttg agtttttgat gtatttttgt 3720
ttttggtgag gaggtaggat agttaggtgt ggaggtagga gattagagtt tgtagagtag 3780
aggtttttttt aaggtgattt gggagttgtt agatttaagg tagtgatttg tatgttttga 3840
aagagattta gggtgttgta ttattaggga ggattatgga ggtttgttgg gggttgggag 3900
ttagggataa gatataatgt ttagggttgt tggtttttga aaggttttag aggtttggtg 3960
ttttgttatg ttttaggttg tgggatatgt agagattgtg ttagttggtt ttgttttttt 4020
agtatttggg gtatagggag gatggttttt ttgggggtag ggtggaggag gtttatgttt 4080
aggattgtaa atgttatttg tgagagttgg tattttgatt ttgttttaga tattgatttt 4140
ggatttttta attgatttttg aaaggttatg tttttaattt tttgattgta aaagagggta 4200
aattttatga agtttagttt gtaaaatatt gaggttttta ttgtatgtat ataaatataa 4260
aatttttagaa tatagaagtt ggaaggttat ttggagattt tggttttagg agtggggttt 4320
tggaagggag ggggttgttg agtgggtttt atattttttgt tttttttttt tttatttaaa 4380
tttttttttgt tttatttatt ttggttgttt tggggagtgg ggggaataaa ggattttaag 4440
gttataaaat gtttgaaaat tattagtggt ggttattatt ttttattata gggaggaatt 4500
gggtttgaga gtttttattg gttaatggta gttataggta ggattaaaaa tttttgggtg 4560
atggtgatga taatgataat gataatgata atggtagaga tgatgaggag gagaaagata 4620
gtaattattt atttagtata tattgattgt tgggtttttgt ttaagtgttt tatttattga 4680
agtttgataa taattttatg aggtagatat gattatgatt attatattta atagagaggt 4740
taagtaattt atgttaagtt atatagtaag taagaaagga gttggaattt aaatttaggt 4800
agtttggatt tagaattttt gtttttttttt tttttttttg agatggagtt ttgttgggat 4860
tataggtgta tgttattatg tttggttaat ttttgtattt ttagtagaga ttaggttttg 4920
ttatgttggt taggttggtt ttgaattttt gattttaggt gatttgtttg ttttggtttt 4980
ttaaagtgtt gggattataa gttaatgagt ttggtttaga atttttgttt ttgattatta 5040
tgttatattg ttttatgatt ttgttatatg taagatgggt tgttatttat gttttggttt 5100
ttttatttta gtagagttag aggggtgttt atggatttga taatgtgttt tatgttttat 5160
gtgagtgttt aattgggttt tagtttagag aatagtagga aaatggtttt tttttttttt 5220
gatttggatt gaagatttgt ttgatgaatt aggtttattg atagtagggt tgaagttgga 5280
aatataggtt agtggggttt tttgaaatat tagagtaaat gtttttttgtt tatttttata 5340
ggttgagggg tttttatttg tttattttttt ggattaggta aatttaggag aatggttttt 5400
tgtggttgtt tgggggggttt ttagttgtaa ggtttgggtt tataggaggt aggtagttgt 5460
gtggtgttgg aatgatttttg tggggagata aattagtttg attttgtttt gttgtttaaa 5520
gtaaatatgg ggtggggtgg ggtggtttag gtttataatt ttagtatttt gggaggtagg 5580
attggggaat tgtttgagtt taggagtttg agattagttt gagttatata gtgagatttt 5640
tttttttttat aaaaaataaa taaaattagt tgggtgtggt ggtgtgtgtt tgtagtttta 5700
gttatgtggg aggttgaggt aggaggatta tttgggttta ggagattgag gttttagtga 5760
gttaagatta tattattgta ttttagtttg ggtaatagag taatattgtg ttttaaaaaa 5820
atattaataa agtaaatatg agtttttttt ttggttgttt ggtgttgagt ggaaagaaag 5880
gtattggtgg gtttagattt ttttggttta tatatggatg agtaatgatt tagagaggtt 5940
aagtgatttt aatattatag agtatattgg tgttagaatt gggattggaa tttagttttt 6000
gtaattgtta gttttatgtt tttttttttta gatattagag ggtaggggta ggttttaaaa 6060
tgtttgagat ttttagttgt tttgtggttt aaatttttgg ttttgttttg ttttagatag 6120
tttgttttta gtgttttgat ttttgattat tgtttgtgta tgttaggttt tgtatttgtt 6180
aggtgggagt ttaaggatta ttgttgttag ataataatag ttaggagttt aggatttttt 6240
ggatgaaagg tgttagagat aagttgttag tgatgtatga ggatttggat aaggttttgg 6300
agtgaggtgg taatgttggg tatggtggta gattatgttt aatatggggg aagggagtgt 6360
atgtggttta ggtttgtgtg tgtttttgtg tgtgtgtgta ggtgagtatg gtgtgtgttg 6420
ggatatattt atgtgtattt ttgtgtgagt gtgtaggttt atatgtgagt gtgtatatat 6480
atttgtgaga gtttgtatgt atgtatatgt gtgaggtgtt gatatatgtt tatgtaggta 6540
ttagtttgtt tgtaaatatt tttgtgtaat aataataaag tttgaatagt tattaagagt 6600
atagatatga agttagattg tttgggttaa atttttagtt agttagtttt ttggtgtttt 6660
tgtttttttt tttgtaaaat ggtgtttatt ttattaggat tttaaaatta gttaatatgg 6720
ttgggtgttt gtaattttag tattttggga ggttgaggta ggtggattat aaggttagga 6780
gattgagatt attttgttta atatggagaa ttttgagaat tgtttaaatt taggaggtgg 6840
aggttgtggt gagtagagat tgtattattg tattttagtt tgggtaatag agttagattt 6900
tattttaaaa aagaaaaata aaaaataaaa aaattatgaa tttattttta ggttgaggag 6960
tttagtattt tggttgtgaa atattttttt tataaaattt tgggatggag attatgggga 7020
ttaggtgttt ttttgtgata atttttgggt atggtggttt agggtgtaaa ttggagtgtg 7080

```
gttataatat atattgtgta tttttataag gatgttatag agtttgggta ttataaaaga    7140
ggagtttttt aaggaattga aattattaga taggagagag agttttgggt agatagggtt    7200
gtttgtgtta aatattttag ttgtggtata agggaaaggg tgggagttat gaaattgttt    7260
tattttgggt ttaggtttgg gttttgttgt tagttagtta agtgattttg gttatttatt    7320
tttgtggttt tttatgagta aaaggtggaa atttattttt atttagaggg taggtttgat    7380
ttttttttaat tagtatttat ttgtttatag taggaaggat tgaggtttaa agttggaggt    7440
gggtaggaag gattgaggtt taaagttgga ggtgggtagg aaggattaag gtttaaagtt    7500
ggaggtgggt aggaaggatt gaggtttaaa gttggaggtg gttgtttaga gttttagtag    7560
aggtttttgg ggtattttat tgagtgtttg gtaggagtgg gtgtttgttt tagggttggg    7620
ttgagttgtt tttattagga tttttgtta tttgtatagt gaggggattg ggaggtttag    7680
agagttatag tttgggttta aaataagtaa gaggtttttg agtgtgagga ttgttttgga    7740
gtggaatggt ttttataggt aggagtgagt tttttgtagt tagaggtatt taagtagttg    7800
aaggataatt tttgggtagg aagttgtaga gatggttgta gtgtggatta gaattgttgt    7860
tttggttatt tagattttat tttagtttgg tttttttgga tagtattttt gtaatagtga    7920
gttggtgatt ttatgtttta gaattttggt ttttatattt gtaaaatggg aattatatga    7980
tatttattat gtgttagata ttttgttggt atatagtata tattatttta tttaattttt    8040
taagtaggga taagttattt ttattttta tatgaggaag ttgaggtata gagaggtgaa    8100
gtgaatggtt taaggttata tagttgggaa gatagggagt taaatttgaa ttttagtttg    8160
gttgttttta gattttatat tgtatttttt atgttgattt tagttttttt tgtgtttata    8220
gg                                                                    8222
```

<210> 65
<211> 8222
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 65

```
tttgtgggta tagggaaggt tggagttggt atgggaggtg tggtgtgagg tttgggggta      60
gttagattag agtttaagtt tagtttttttg ttttttttagt tgtgtgattt tgggttattt     120
attttatttt tttgtgtttt agtttttttta tataagggat ggggataatt tgtttttatt     180
tgaaggatta agtgagatag tgtgtgttat gtattaatag ggtgtttggt atatagtgag     240
tgttatataa tttttatttt atagatgtgg aaattgaggt tttgaggtgt aaagttatta     300
gtttattatt gtaggggtgt tgtttagaga agttaggttg gaatgaggtt tgagtgatta     360
aaatagtagt tttagtttat gttgtgatta tttttgtagt tttttgttta gggattgttt     420
tttagttgtt taaatatttt tagttatagg aggtttattt ttatttgtga gggttatttt     480
attttagagt aatttttata tttagaaatt ttttgtttgt tttgagttta agttgtgatt     540
ttttgaattt tttagttttt ttattgtgta gatgatgaag ggttttggtg ggagtaattt     600
aatttagttt tgagataggt atttattttt gttaggtatt tagtgaggtg ttttagaggt     660
ttttgttggg attttgagta gttattttta gttttagatt ttggtttttt ttgtttattt     720
ttaattttag attttggttt tttttgttta tttttagttt tagattttag ttttttttgt     780
ttatttttag ttttagattt tagtttttttt tgttgtgagt aggtgggtgt tggttaaagg     840
gagttagatt tgttttttgg gtaggagtga gtttttgttt tttatttatg gaagattata     900
gagataagtg gttaaggtta tttggttagt tagtggtaga gtttagattt aaatttaaaa     960
tggaatagtt ttataatttt tatttttttt tttgtgttat agttgaaatg tttggtatgg    1020
gtaattttgt ttgtttaggg ttttttttttt tgtttaatgg ttttagtttt ttgaaaagtt    1080
tttttttttat gatatttagg ttttgtgata tttttgtaaa agtatatagt atgtattgtg    1140
gttatatttt agtttgtgtt ttgagttatt atgtttagaa gttgttataa ggaagtattt    1200
gatttttgta gtttttattt tagggtttta tgaggagggt attttataat taggatgttg    1260
agttttttaa tttgaaaatg agtttatggt tttttttgttt tttgtttttt ttttttgaga    1320
tggaatttgg ttttgttgtt taggttggag tgtagtggtg taatttttgt ttattgtaat    1380
ttttattttt tgggtttgag taattttttag aattttttat gttaggtagg atggttttga    1440
tttttttgatt ttgtgatttg tttgttttag ttttttaaag tgttgggatt ataggtgttt    1500
agttatatta attgatttta aaattttgat ggggtagatg ttattttgta gaggaagaaa    1560
tagaggtatt gaaagattaa ttagttgggg atttaattta ggtagtttgg ttttatgttt    1620
atattttga tgattatttg gattttgtta ttgttatata gagatattta taggtaaatt    1680
gatatttata tggatatgta ttaatatttt atatgtgtat atgtatgtag gtttttatag    1740
atgtgtgtgt atatttatat atgggtttgt atatttatat agaggtatat ataaatatat    1800
tttagtatat gttatattta tttgtatata tatatagaga tatgtataag tttgaattat    1860
atatattttt ttttttatg ttgggtatgg tttgttgttg tgtttaatat tgttattttg    1920
```

ttttaggatt ttatttaaat ttttgtgtgt tattgatggt ttgtttttga tattttttat 1980
ttaagggttt ttgagttttt gattattatt atttggtgat aatgattttt gaatttttgt 2040
ttgatagatg taagatttgg tatgtatagg tgatggttag aggttaggat gttgaaagta 2100
gattgtttga ggtagagtag ggttaagaat ttgggttata aggtagttgg gggttttaga 2160
tattttgggg tttgtttttg ttttttgata tttagggaag agaatatggg attgatagtt 2220
atggaagttg agttttggtt ttagttttgg tgttaatgtg ttttgtgatg ttgaagttat 2280
ttagtttttt tggattattg tttatttata tgtaaattaa aagggtttag atttgttaat 2340
gttttttttt ttatttaata ttagatagtt agggagagag tttatattta ttttattaat 2400
atttttttga gatatggtat tgttttgttg tttaggttgg agtgtagtgg tgtgattttg 2460
gtttattgga gttttaattt tttgggttta agtgattttt ttatttttagt tttttgtgta 2520
gttgggatta taggtatata ttattatgtt tagttaattt tgtttatttt ttgtagagaa 2580
gggggggtttt attatgtggt ttaggttggt tttgaatttt tggatttaag tgattttttg 2640
attttgtttt ttaaagtgtt gggattatag gtttgagtta ttttatttta ttttatattt 2700
attttaaata gtagagtaga attgggttaa tttgtttttt tgtaagatta ttttggtatt 2760
atatagttgt ttgtttttttg tgggtttagg ttttgtagtt aggagttttt taggtagtta 2820
tagaaggtta ttttttttgga tttgtttgat ttggaaaatg aatagatgaa agttttttag 2880
tttgtggaaa tggatggagg gtgtttgttt tagtatttta gaaagttttg ttggtttgtg 2940
tttttagttt taattttgtt gttagtgggt ttggtttatt agatagattt ttagtttaag 3000
ttagagagaa gggaggttat tttttgttg tttttttgaat tgaggtttaa ttggatattt 3060
atatggaata tggagtatat tgttagattt atgaatattt ttttggtttt attagaataa 3120
aagaattaga gtgtgggtgg tagtttgttt tgtgtgtggt aaggttatgg ggtagtatag 3180
tatagtggtt aagagtaagg attttgggtt gggtttattg gtttgtaatt ttagtatttt 3240
gggaggttaa ggtgggtaga ttatttgagg ttaggagttt gagattagtt tggttaatat 3300
ggtgaaattt agtttttattt aaaaatataa aaattagtta ggtatggtgg tatgtatttg 3360
taattttagt aagattttat tttaaaaaaa aaaaaaagga gtaaggattt tggatttaag 3420
ttgtttgaat ttgaatttta gttttttttt tatttgttgt gtgatttggt gtaagttatt 3480
taattttttt gttaaatgtg gtgattataa ttatatttat tttataagat tgttgttagg 3540
ttttagtgag tgaaatattt aaatagagtt tagtaattag tatgtgttga ataaatggtt 3600
gttgtttttt ttttttttat tatttttatt attattatta ttattattat tattattatt 3660
attatttagg aattttttggt tttgtttgtg gttgttatta attggtggag atttttaggt 3720
ttagtttttt tttgtaatga gaagtagtga ttattattgg tgatttttaa atattttatg 3780
attttgaaat tttttgtttt ttttgttttt taaaatagtt aaagtaaata aaataaaaaa 3840
ggtttgagta aagaaaggaa aaataggggt gtggagttta tttagtagtt tttttttttt 3900
tgaagtttta tttttggagt tagaattttt aagtgatttt ttagtttttg tgttttagaa 3960
ttttatgttt gtgtatgtgt agtgaaggtt ttagtgtttt atagattggg ttttatggaa 4020
tttgtttttt tttataatta gaagattgga gatataattt tttaaggtta gttagaaaat 4080
ttagagttag tatttagaat aaagttaaga tgttaatttt tatgggtggt atttgtagtt 4140
ttgggtatga gtttttttta ttttgttttt agggaggtta ttttttttgt attttaaata 4200
ttgagagggt agaattagtt ggtatagttt ttgtatgttt tataatttaa gatgtgatag 4260
ggtattaggt ttttgggatt ttttagggat tagtaatttt aggtattatg ttttattttt 4320
ggtttttggt ttttggtaaa tttttgtgat ttttttgat gatgtaatat tttgagtttt 4380
ttttaagatg tataagttat tgttttaggt ttggtagttt ttaaattatt ttggaaagat 4440
ttttgttttg taaattttgg tttttttattt ttatgtttga ttgttttgtt tttttgttaa 4500
aggtaaaagt gtattaagga tttagagaat tttagggtat gagtgtggga tgggattttg 4560
gagattatgg aagataattt ttttgtttaa ttagtagaga aataaggttt agaggtggag 4620
agatttgttt aaggttatat ggtatatttg tggtttagga gttgatgtta atttgtgtgt 4680
gtgtgttggt tgggggagta ttttgtgtaa tttaataggg tttgttgtag ttagatgata 4740
gggataggag aagaaagata taaatatatt atgatgttat tatagttaat agaaaattta 4800
attttttttt tttaagtgtt tttagtatgg attattaatg gtttaaattt tagataatgg 4860
agtttttagg attagttatg tttttgaggt agatggaagt tggaaatggg taaagtttaa 4920
gggagattta aaggatgatg gagtggaaga ggaaaattgg ttttggttta taaataagga 4980
gaaattaatt tgtaaattaa agtgttaaag ataatttatt tatttgtggt aattttggtg 5040
tttatttttt tttttttgtt ggtagaaatg ttgattttta atttattaga tttttgaggg 5100
aattagttta gaatggtgag ggaaggggtt aagagaagag tgtattattt ttgggataga 5160
aggtaatgag gagatgagtt tttatgtata aattatagtt atttttttatt tataaatttt 5220
agaattttgt ttttttttggt gtattttgga attttttgtg gtagaaggta ggatatattt 5280
gtagattata ttatttagat tttttaaatt agagatatat ttaatattga aggttattaa 5340
tgagttttta tttttttgttt tttaattgta atgttttgaa aggtttttag tttgggtttt 5400
attagtaata gttattaata tttttaggat ttagtatatg ttaggaatta tgttaggttt 5460
tttgtatgta ttattttatt taatttttat atttttttta ggatatagat attaggatat 5520
tttttttattg tataggagag gaaattgagg ttttgagagg ttgagtattt ttttaaaggt 5580
tatttagtgg tttagtggta gagttaagtt tagaattaga tttgtttttt tttgaagagt 5640
atgttttaat tttgatattt taagagtatt taatgagttg tgattttgga aatgtttttt 5700

```
tttttttagt ttttttttgt ttttattttg taagagaggt ggttgtataa aatttttttag 5760
gatttttgtt aattttgatt gtttataatt ttaaaatttt ttttggtgga ttttgagtat 5820
tttaggtttg attttatgt ttttttagt tgttgatatt agtttgaaat ggttttttt 5880
ttttttttga gtttaatttt tgatatttaa aagtaaagaa aaagtaagtg attgttttaa 5940
tatttttaat taatgtagtt aattgattta ttttatgtgt aaattttttta ttttgtagtt 6000
gaatattttt gatttaggg tgtgggtggt aggggtaatg gaattttttt tttttatttg 6060
atgaggattt tttgtttatg gtttgggatg ttagttttta ttttttttta gatgtttagt 6120
attaattgtt atttttgtt gttgagtttt atggtgtagt ttgaagaaga taaaaagagt 6180
aagtatgggt ttattgggtg ttttggtttt aatagttggg gtttgaggtt gtttggtttt 6240
aagggtgttt ttatatttt tgggatgttt gataaagatt gtttaatggt ttgttgtttt 6300
ttttttttgt ttttttttat ttttttttt ttatttaggg agggtttaat ttttttttt 6360
ttttagtttt tatatgggaa gttattttag ggtaggtgtt attgtggtga ggtaggatag 6420
tttaggttat aggggggtggg gtggttgtgt gtgtggaaag aaggggagga ggttgggtat 6480
tgtttggatt tttatagttg atagaaaggg tattatagaa gttgatgtta gtagtttgaa 6540
atttaatgtt ttttgtggtt agtttttttta agaggatttg ttatgtttt aagtttggtt 6600
attaggtgtt ttggttggtt ttaggatagt tttggttatt tgtaattttt tatgtatttt 6660
ttgttttttt gttagagatt ttttatttag ttagaagtga tagaaaggaa ttggatggtt 6720
ttgtgtttat agttaggtgg ttttaggtaa gtttataatt ttttagagaa tttttgtttt 6780
tatgattttg tttaaaggtt tttttttgaa aagttttttt tgatatattt ttttgagata 6840
ttattaattg ttttttttt ttttttttt gtgtaagttt ttgttgtatt gtttttttaaa 6900
gggtatttta tttttttggtt tttatgttat ttttttttatt aggataatag tagttagtat 6960
ttataagaga ttttgttggg tgttaggttt tgttttaaat atttggtatt tggtaattta 7020
tttaattttt gtaagatttt ttaatgtgat aggtattgat attattttta tttaattgag 7080
agaaagtagg gaaatattat tgatgtataa ttagttgttg gtagagttgg gatttgaatt 7140
taggaagtta tgttttttttt tttgtagttt ttaggagggt aggagttttg ttttattaat 7200
ttatgtattt tttgggtttt atatggtgtt ttgtgttaag tttgaattga ataaatgttt 7260
attgagtaaa tgggtggatg gttttgtaaa gaaagagagt ggaggatgat tagttttatt 7320
ttatatttat gtattttttt ttaatttatt taggtattta attatttatt tatttattta 7380
tttgtttatt tagttattta tttatttatt tatttgttat tttttaattt atttatttat 7440
tattttttttg tttatttatg tatttattta tttatttatt tattatttat ttatttaata 7500
tttattaatt tttttattta tttgatattt tttaatttat ttatttattt atttattatt 7560
tttttgttta tttaggtatt tatttattta tttatttatt tatttattta aaatttatta 7620
gtttttttat ttatttattt atttatttat ttatgtgttt atttatttat tttttaattt 7680
atttatttat ttattatttt tttatttatt tatttattta ttttttttatt tatttattta 7740
ttattttttt atttattatt ttttttttta tttatttatt tatttattat ttatttattt 7800
ttttatttat ttatttgttt ttttattttt ttatttattt atttatttat ttttttattt 7860
atttatttat tatttttttta tttattattt ttttttttatt tatttattta tttattattt 7920
atttattttt ttatttattt ttttatttat ttgtaatttt atttatttat ttattttttt 7980
tatagtgata gagtatttat tgtgtgttag atattgttat atgttgagga taataaaatt 8040
aaataaaata ttttttttgtg tttaaggaat ttagagtttt tttagggaga taattaagag 8100
gaatgaaaat atagtatagt ttgtttagtg ttatgattaa ggtaggtata ggtttttttt 8160
tttatttgta taagattata tagtttataa agtggttgtt tggtaagatt atatttaatt 8220
tt                                                                8222
```

<210> 66
<211> 3051
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 66

```
atagtggttt atgtttgtaa ttttatattt tgggagattg attgggaaga ttgtttgagt 60
ttaggagttg gagattagtt agagtgatat agtgggattt tttttttata aaaatattta 120
aaaattagtt aggtatagtg gtgtattttt gtagttttag ttatttggga ggtggtaaga 180
ggatttttttg agtttagaag ttggaggtgg tagtgagtag ttattttgtt attgtatttt 240
agtttgggtg ttaaagggag atttttttttt ttagaaaata ataaaaaaaa aagtttgata 300
gtttttttgt ttgtgttata taaaataatg gtatatatta taattgaagg tattttataa 360
tagaaatgtt tttttttgtt tttttttaag gttgatttag tgttttaaga ggttgatata 420
gaagggtaaa gttaagtttt tataaaattt agggaagaga ttgtgaaatt tattttagaa 480
ttttgtatgg agttatagtt gaattaggaa aaaaaaaaaa aaaaaaaaaa ggaaagaaag 540
```

gtattttaga gataaagaat agattaagga gaggagatat ttgaagttat aatgattgag 600
aatatgttag atttgaaatg aatttttagt tttttaata agataaataa aattaatttt 660
atatttagat atatggtaga aaaattaaag aattttgttg attaaggtat taaaagtaat 720
taaagagaag tggtgtgaag aaagtaagag agaaataata aattttgttt attttgtaat 780
aattgaaaat ttttggttgg gtgtggtggt ttatgtttgt aattttagta ttttgagagg 840
ttgaggtagg tggattattt taggttaggt gtttaagatt agtttggtta atatggtgaa 900
attttgtttt tattaaaaaa aaataataat aataatataa aaattagttg ggggtggtgg 960
taggtatttg taattttaga tatttgggag gttgaggtag gagatttatt tgaatttggg 1020
aggtggaggt tgtaatgagt tgagattgtg ttattgtatt ttagtttgga tgatagagta 1080
ggattttatt ttaaaaagaa aggaaaagaa aagaaaaaat attaaatgtg tatgtttttt 1140
gatttagttg tattatttta aggagttgat attattaaaa ttgtttaagt gtttaaaggt 1200
gtttgtagtt aaataatagg agattgataa attatgttat atatatgtga tgttatgttt 1260
taaagaggta ttgatatgat aaaagatgta tgtggtataa aattaaatgt attttattaa 1320
gtattttttt aagtgtttat ggaatgagtg tatttttgaa aaaaaaaaag tgtatttgaa 1380
tttttaaaaa agttttaaaa gttttatata atgaatgatt gagtgattat aagagttggt 1440
gggggaatgt taagaggatg atagggagtt aagtttaata gaataattta tttttttatt 1500
ttgtgatatt tatgagtgta ttaattttgt aattgaaaaa taaagtgtat atttgtagta 1560
gttgtatttt ttttaggttg taaggaggtt tttttttttg gtaggtttga tttgtatttt 1620
attttttattt ttgtggttgg aaatttttta tttatgtagt gggaggttga ggagttatta 1680
taaagttggg gtttgatgag ttgggattgg gatttgattt ttatatatgt ttggatttgt 1740
tttgtggttg ggtttaggag ttaaagaggt ggggagattt gtgtgatgtt gttttgtttt 1800
gtgtttgttt tttttaatgt atgtttagg gggtgggttt tgtggggagt atggatatga 1860
ttggttttaa agttttttttt gtaaggttgt gggttggata gtgtggtgat gttgtaatgt 1920
ggtgtagggt gagagtgtgt gtttgtggat gtggtggtat taaatggttg taggtgtagt 1980
agagtggttg ttgtttttttt aggttttagt tggttgttgt gatgtttgtt tgtttgtttt 2040
gaggttttg aagttgaaat tagttagatt ttttttttttt ttgtttgttt gtagtggtgt 2100
tgttgttatt ttgttattat gtttgaggtg tgtttggttt agggttttat ttttaagaag 2160
gtgttggagg tatttaagga ttttattaat gaggtttgtt gggatattag ttttagtggt 2220
gtaaatttgt agagtatgga tttgttttat gtttttttgg tgtagtttat tttgtggttt 2280
gagggttttg atatttattg ttgtgattgt aatttggtta tgggtgtgaa ttttattagg 2340
tgagttttgt ggttttggga agttggtttt ggtttgtttg tatttttggt gtttggtggg 2400
agtgtttttg agtttagttt ttattggttg gtgtgggtta tttgtgtttt tttattggtt 2460
tgttatgtag tggggtgggg tttagttgag tgtgtggttt ggaaaagttt gtgttggttg 2520
ttgtgtgaat ttgttttttt gtgttaaagt tataaagtgg gtggtggtgg gaaaattaag 2580
ggttttttg tagtgttagg aatattgttt tagggttttt tgtttattaa attttgttgg 2640
ttttgaatgg atgttttagt tgtggttttt ttgtttttga gatggttttg gtgtgttgtt 2700
tgggttggtt tttaattttt gggtttaagt gattttttttg gtttagttgt ggttgatttt 2760
aaatgtttta taatgttttt gtgagaaatg tggtagtttg ttattttatt tagtggtagg 2820
agattgtttt tatttagaag ggatattgtt ggtggtattt tagtataaat attgttagat 2880
gtgttttaaa atgtttgtat taataatggt atttttagt agtttgttta tttttatta 2940
gttttgagat ggtttgatgg gtgagagtgg taattttttt taattgtgtt tgaaatatag 3000
tttttagta gatggtgttg attttaaagt atgtgttttt tgtttttag t 3051

<210> 67
<211> 3051
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 67

attagaagat aggagatata tgttttaaaa ttaatgttgt ttgttgaagg gttgtatttt 60
gaatgtggtt agaaggggtt attattttta tttattaggt tgttttagaa ttggtggagg 120
gtaagtggat tgttggagga tgttattatt aatgtagatg ttttgggatg tatttggtag 180
tatttatatt aaaatattat tagtagtgtt tttttggat agaaataatt ttttgttatt 240
aagtaggatg ataggttgtt atatttttg taagggtatt ataaagtatt taaagttaat 300
tgtgattgag ttgggaggat tgtttgagtt tagaagttgg agattagttt gggtaatata 360
ttgagattgt tttagaaata agaaagttat agttaaagtg tttatttaag gttaatagga 420
tttagtgagt aaagagtttt ggaatagtgt ttttggtatt gtggaaaaat ttttgatttt 480
tttgttatta tttgttttgt gattttggtg tgaaaaagta ggtttgtgta gtagttagtg 540
tgggtttttt tgaattgtgt gtttagttgg gttttatttt attgtgtggt aggttaatga 600

```
gaaggtgtgg atggtttatg ttagttaatg agggttaggt ttgaaagtgt ttttgttaag     660
tattggaggt gtaggtgggt tggggttggt tttttggggt tgtgaggttt atttggtgag     720
gtttatgttt atggttaggt tgtggttgta gtggtaggtg ttgaagtttt tagattgtag     780
ggtgagttgt attaaagaga tgtgggatga gtttatgttt tgtaggttta tattgttgga     840
gttaatattt tagtaggttt tgttgatgag gtttttgagt gtttttaata ttttttgag      900
gatggagttt tggattaggt gtgttttgaa tatggtggtg gagtggtaat aatgttgtta     960
taggtaggtg ggaaggagga aagtttagtt ggttttggtt ttaggagttt tagagtgagt    1020
gggtgaatgt tgtgatgatt ggttgagatt tagaaagata atgattattt tgttatgttt    1080
gtaattgttt aatgttgttg tgtttgtaag tgtgtgtttt tattttgtgt tgtgttgtga    1140
tgttattatg ttgtttagtt tatggttttg tggggaagat tttagggtta attgtgttta    1200
tgtttttgt gaggtttgtt ttttagagta tatattggag gaagtgggtg tagggtgggg     1260
tagtgttgtg taggtttttt tgttttttg atttttgaat ttggttgtag aataagtttg     1320
ggtatatgtg gagattgggt tttggttttg gtttgttaag ttttagtttt atggtggttt    1380
tttagttttt tattatgtgg gtagaaagtt tttagttatg aaagtgaaag tgaaatgtaa    1440
attaagttta ttgggaggaa aagtttttt gtagtttgaa gagagtatag ttgttgtaaa     1500
tatgtatttt atttttaat tatagaattg atgtgtttgt aggtgttata agataaagag     1560
gtgaattgtt ttgttaaatt tagtttttta ttattttttt aatatttttt tgttagtttt    1620
tataattatt taattgttta ttgtataaag tttttaaagt tttttaaaa gtttgaatat     1680
attttttttt ttttaaaaat gtatttattt tgtaaatatt tggaaaagta tttaataaag    1740
tatatttaat tttatgttat gtatattttt tattatatta gtattttttt aaaatatagt    1800
attatatgta tataatataa tttattaatt ttttgttgtt taattataaa tatttttgag    1860
tatttaggta atttggtga tattaatttt ttgaagtaat atagttgagt taaagagtgt     1920
atatatttaa tattttttt ttttttttt tttttttttg agatggagtt ttgttttgtt      1980
atttaggttg gagtatagtg gtgtgatttt agtttattgt aatttttgtt ttttaggttt    2040
aagtgagttt tttgttttag tttttgagt atttgggatt ataggtgttt attattattt     2100
ttggttaatt tttgtattat tattattatt ttttttagt agagatgggg ttttattatg     2160
ttggttaggt tggttttgaa tatttgattt gaggtgattt atttgttttg gttttttaaa    2220
gtgttgggat tataggtgtg agttattatg tttagttaga aatttttaat tgttatagga    2280
tggataggat ttgttgtttt tttttgttt tttttatatt attttttttt agttattttt     2340
aatattttgg ttagtagaat tttttagttt ttttattatg tatttaggta tggagttagt    2400
tttatttgtt ttgttgaggg aattgaagat ttattttaag tttgatatat ttttaattat    2460
tatggtttta aatatttttt tttttagtt tattttttat ttttggaatg tttttttttt     2520
tttttttttt ttttttttt tttttagtt tagttgtgat tttatataag gtttaagat       2580
gagttttata gttttttttt tggattttgt ggagatttaa ttttattttt ttgtattagt    2640
tttttaaagt attgggttag ttttaaaagg gaataggaaa gggtattttt attataagat    2700
gtttttaatt gtaatatgta ttattatttt atgtagtata agtaagaaaa ttgttaaatt    2760
tttttttta ttattttta gagaggggag tttttttttg atatttaggt tggagtgtag      2820
tggtaagatg attatttatt gttattttta atttttaggt ttgagagatt tttttgttat    2880
tttttaaata gttgggatta taggggtgta ttattgtatt tggttaattt ttaaatgttt    2940
ttgtagagag aaggttttat tatgttgttt tggttggttt ttaattttg ggtttaagta     3000
attttttaa ttggtttttt aaagtgtgag attataggta tgagttattg t              3051
```

<210> 68
<211> 3664
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 68

```
gaatttttaa ttattatttt gtttttttat ttttaatatt tttagtggta attgtatttt      60
atttattttt gtgtttatga agtatagtgt tgtattttgg agatattata tagaagttgg     120
tttaaagggt aataaattgt atttgttaag atgatagtat ggatttataa taatttttga     180
aattttataa agaaagatga ttgagttaaa ttgatatatt tagtattata gttgtggaag     240
tttgtggttt tttttatgtt aaaggtaaaa tggatataat gaattagttg ttatttttag     300
atgatataga agttgaattt tttttaagtt ttttaaagag aaagatatat taaaatttat     360
taaaattagt attataaatt gtatagaata gtttggtttt ttagagtatt tttttggggt     420
agtgagtttt tatttaaaaa atgaagtttg gattttaaat ataagtttta aaagtgatta     480
ggttttagta ggagttttta aatttttatt tatattatga tttttaaatg ttttgttttt     540
gttgtttagg aataaaaatt gttaaggttg agttagatgt aatgtataat attagatgat     600
agatgtagtt tattgtgtta aaaggtgtta aatatttaag tgtatgtgat atattttata     660
```

```
ttataagggt aaggaagttt tattttatat tttgatttgg gttttttaat atatatttgt     720
agtggatgtg gtaattagtt tttgttttat gttttattag gattaatgta attagaaatt     780
tttaaaatgg atttttatta tgtttagttt tgttttattg ttttatttgt ttattttaaa     840
aagattttag aatggtgttt aggttgggtt ggtggtttat gtttgtaatt ttagtatttt     900
gggaggttaa ggtaggagga ttgttggagt ttaggagttg gagattagtt agggtaatat     960
aaggagatat tgtttttgta aataaataga aaaaaaaaaa gtaagaaaga aagagagaaa    1020
gaaggaaaga ataagaaaaa ggaaaaaaaa attaattgta gtaagtgtag aaattttttt    1080
taaggatatg atggatggta atgaagatag agtttttgat attggattat ttaaagtata    1140
atttaagttt tttttttttt ttttatagaa ttgtgaattt ttgtgtttta attatattta    1200
agttaggtgt ggtggtgagt gtttgtagtt gtagttgtgt tggaggttga ggttgattgt    1260
ttgagtttag gatttggagg ttagtatgtg taatataatg agatttagtt tttaaatgta    1320
tgtttttttt tatatattta aaattttgat gtgaaaatat tttaaaattt aatatatttt    1380
aaatgttttt aattgtataa taaataaaat gtaaataata aaataattta atattaaatt    1440
taaaaatgag gtagaaataa agtatagtga tataaataat aaattttttt ttatattttt    1500
gaggtggttt tttgagtttt ttattttttt tttaaggtta ttgaaatgtg tttttttggag    1560
ttagtttgta aattatgtat ttagaaaaat ataattatat atttttaatt ttaagtatta    1620
gaagtgaaag taatggaatt ttgatgtaaa tataatatta ttttttttgat gagttatttt    1680
gagtataata aatttgaatt gtgttaatgt tgggagaaaa aatttaaaag aagaatggag    1740
tgaatagtag tttttttgttt tgttgattag aaatagtagg atgatatttt tttgattgga    1800
ggagagtgtt tgtgtttgta tttagttggt gtttgttttt ttgtttttttt tttagttgtt    1860
tttttttttt tttttttgtgt tttagttatt tgggaaggtt tgtttagtgt agttgggttt    1920
tgattggttg ttttgaaagt ttatgggtta tttgattggt gaatttgggg tttttttagtg    1980
tggtgagttt gaaattgttt gtatttggtt ttaaagttgg tttttggaaa ttgagtggag    2040
agtgatgtgg ttgttgtagt tgttgttgtg gttgttgtgg aataataagt tgggtatagt    2100
ggttggggtt agggttgtgt ttaggggatg gttgagggtt ttggagggtg agtattgagg    2160
aatggggttt tttaagaagg ttggattgga ggttagggat ttgtgtgggg tttggttggg    2220
ttttgggggg tggtgggtag ggtttttgtt tgggtttggt tgtgtgagtt atattgggtt    2280
ggttttagag ggaggttatg ggagtttagt ttggtggggt taggtggtgt gggggtgggg    2340
gtttggggtt gtagttatga gttgaggttg gttgttttta ggaattgttt gaagaggttt    2400
ttgggttttg attgaagtaa aatttgtttt tttatgttga gtgtttgtgg agtagtaggt    2460
ttttttttgg gtttggtttt tgtgtgtttt gttattttgt tttgggggtg ggaaagtggg    2520
attgtatttg ggttaggtat aggtgtgggt ttttagagtt aggttgtttt gagaaattga    2580
ttttggaatt tgtgggtttt tttgggtttg ttttgtttat ggttttggtt tatttggagt    2640
tgttaagaat agttagttta ggtatttaat ttttatgagt agtgtagtgt agtttttttt    2700
atttaaaaag atatattttt gttttttttt ggattgattt ttttttgaag atgaatgtga    2760
gaaatagaat ttaaaggttt attttgagtg tgttttataa atgattttat tattagtgat    2820
gggtgttaga aaaatttagg taattatgtt tggagttttg atgttttatt ggtaaatttt    2880
agaggaagtt ttgaattttt ggttgttagt tttttttttt aatttattta ttgtgattta    2940
agtatattgt ttttttgttt agtttttgat attgtttagg ttataattag aattttattt    3000
gtggaattgt atttttattt tttttgtttt atggtgttta agtgatattt tttatttttg    3060
gaaaaagtat tttgaaagtt ttgagtatgt ttgtttgtga ttttagtaag tagaggaaaa    3120
agattaaaat tgttatgtgg gtaattgtaa atatttaaaa tgtttttgtt gttttaaata    3180
aaattttttt aatgaatagt ttgaatatat tttagttttg tttttataat tttaaaaaat    3240
aatgttttga ataaaattag gagtattata aagtggtata aatttgttga aatatttggg    3300
tataattttg gtatatgtag gtattatttt aaagtgttat aaaaagggaa tataattttg    3360
gtttttgttt ggaaagaata gataagttga tatttgaatt tgagggttat tttgattgga    3420
agaagttaaa tattatatta gtatagaata tatatgtttt taatgtttta ggagttaaga    3480
aggatggaaa gttattgtag gagtttttat ttttgtaaat attgtttgaa tgtaattaat    3540
atttatggaa tatttatgtt gtagtaggta ttgtggaaaa tgttttatat atagtgtttt    3600
attaatgttt aaaattattt gagttagtgg tatgtaatta agttagtttt tttttttattt    3660
tagg                                                                 3664
```

<210> 69
<211> 3664
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 69

```
tttaaagtga aggaaaaatt gatttaatta tatgttatta atttgagtag ttttaagtat      60
```

```
taatgaaata ttatatgtaa agtatttttt atagtgttta ttgtagtata agtattttat     120
aaatattaat tatatttaaa taatatttat aagggtaagg atttttataa taattttttta    180
tttttttga tttttgagat attggaaatg tgtatatttt atattagtgt agtatttagt     240
ttttttaat taaaataatt tttaaattta ggtattaatt tgtttatttt ttttaaataa     300
aaattagaat tatgtttttt ttttgtgata ttttaaagta gtatttgtgt gtgttaaagt    360
tatatttaaa tattttaata aatttatatt gttttatgat atttttaatt ttatttaaaa    420
tattattttt taaagttatg aggatagaat taaaatgtgt ttagattgtt tattaggaaa    480
atttgttta aaatgataaa aatattttaa gtgtttatag ttgtttatgt gataattta     540
attttttttt tttgtttgtt gaggttatag ataaatatgt ttaagatttt taaggtattt   600
tttttaagag taggaaatat tatttaagta ttgtaaaata aaagaatgaa aagtgtaatt   660
ttatagataa aattttaatt ataatttaaa taatgttaag gattaagtag aaaaatggta   720
tatttgaatt ataatgaatg ggttaaaaaa aaaagttgat aattagaagt ttaagatttt   780
ttttgaagtt tgttaatgaa atgttagaat tttaggtata attatttaga ttttttttaat  840
atttattatt gatgataaaa ttatttataa agtatattta gaatagattt ttaagtttta   900
tttttatat ttattttaa agaaaaatta atttagaaag aagtagagat gtatttttt      960
aaatgaaaaa aattgtatta tattgtttat gagagttaag tgtttgggtt gattgtttt    1020
aatagtttta ggtgggttgg ggttgtgggt agagtaagtt taagaaggtt tatgagtttt  1080
aggattggtt ttttagggtg gtttggtttt agggatttgt gtttgtattt ggtttaggtg  1140
tggttttatt tttttatttt tgaggtggga tggtagggtg tgtaggggtt gggtttagga  1200
aagagtttgt tattttgtag gtgtttagtg tgggggagtg gattttgttt taattaagat  1260
ttgaaagttt ttttaggtag tttttgagaa tagttgattt tgatttatga ttgtagtttt  1320
gaatttttat ttttatgttg tttaatttttg ttaggttggg tttttatagt tttttttttaa 1380
agttagttta gtgtggttta tatggttaga tttaggtgaa ggttttgttt attgtttttt  1440
gaggtttagt tgggttttgt gtagattttt gatttttagt ttggtttttt tagaggattt  1500
tgttttttaa tatttgtttt ttgaggtttt tggttgtttt ttagatatga ttttgatttt  1560
agttattgta tttggtttat tattttgtgg tggttgtagt ggtagttata ataattgtgt  1620
tgttttttgt ttaattttta agagttagtt ttgaagttaa gtgtgagtag ttttaaattt  1680
attgtgttaa agggttttgg atttattaat tgggtagttt gtagattttt aaagtagtta  1740
attagagttt agttatgttg ggtaggtttt tttgggtggt tagagtgtga aagaaagagg  1800
aaagggtggt tagagaaaaa gtaggagggt gggtgttaat tgagtgtgag tgtaagtgtt  1860
tttttttagt tgggagagtg ttgttttatt gtttttagtt agtggagtag gaagttattg  1920
tttgttttgt tttttttta aattttttttt tttagtattg gtatagttta aatttattat  1980
atttaaaata gtttattaaa aaagtgatat tgtgtttata ttgagatttt attattttta  2040
tttttaatat ttagggttag gagtgtatag ttatgttttt ttaaatgtgt gatttgtggg  2100
ttggttttaa ggagtatatt ttagtgattt taagaaggaa atggaaaatt taaaagattg  2160
ttttaaaaat gtaaaggaaa atttattatt tatattgttg tgttttgttt ttattttatt  2220
tttgaattta atattaaatt attttattat ttatattttg tttattatat aattaaaaat  2280
atttgaaatg tattaaattt taaaatattt ttatattaga attttaaata tatagagaga  2340
ggtatgtatt tagagattgg gttttattat gttgtgtatg ttggttttta aattttgggt  2400
ttaagtaatt ggttttagtt tttagtgtag ttgtgattat aggtatttgt tattatgttt  2460
ggtttaaata taattaaaat ataaaaattt ataattttat gaggggagag aaagaggttt  2520
aaattatgtt ttaaataatt tagtgttaaa aattttgttt ttattgttat ttattatatt  2580
tttgagagag atttttgtat ttattgtagt taattttttt tttttttttt ttgtttttt   2640
ttttttttt ttttttttt ttattttttt ttttttgtt tgtttgtgga gataatgttt      2700
ttttatgttg ttttagttgg tttttaattt ttaggtttta gtaatttttt tgttttggtt  2760
ttttaaagtg ttgagattat aggtgtgagt tattagttta atttaaatat tattttaaaa  2820
ttttttttaaa ataaataaat agaatagtaa aatagagtta gatataataa aaatttattt 2880
taaggatttt tggttgtatt gattttaatg ggatatagaa taaagattga ttattatatt  2940
tattataagt atgtattaga agatttaaat taggatatgg aatggaattt ttttattttt  3000
gtgatataga gtatattata tgtatttaag tgtttaatat tttttaatat aatgagttgt  3060
atttattatt tggtgttata tattgtattt ggtttaattt tgataatttt tgtttttagg  3120
taatagaggt agagtatttg ggagttatgg tgtaggtagg aatttaagaa tttttgttgg  3180
agtttaatta tttttaaaat ttatgtttaa aatttaaatt ttattttttta aatgaaaatt 3240
tattgtttta gagaagtgtt ttagggaatt aggttgtttt gtgtagttta tggtattggt  3300
tttaatgaat tttaatatgt tttttttttt gagaggttta agaggaattt aatttttata  3360
ttatttaaaa atggtaatta atttattata tttattttat ttttaatata aagaagatta  3420
taagttttta tagttgtgat gttaggtgta ttaatttaat ttaattattt tttttataa   3480
agttttagag gttattgtaa atttatgtta ttattttggt aaatatagtt tattattttt  3540
tgggttaatt ttttatgtagt atttttaaag tgtaatattg tgttttatag atataaaaat 3600
gaataagata tagttattgt tggaggtgtt gagggtaggg gagtaggatg ataattggga  3660
attt                                                                3664
```

<210> 70

<211> 1729
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 70

```
ttgtattttt ggttggggta ttttaattag aattgttaaa tttagtatat aaaaataagg      60
aggtttagtt aaatttgaat tttagataaa taatgaataa tttgttagta taaatatgtt     120
ttatgtaata ttttgttgaa attaaaaaaa aaaaaaaaag tttttttttt atttttattt     180
ttattattag gtttaaggaa tagggttagg ggttttaaat agaatgtggt tgagaagtgg     240
aattaagtag gttaatagaa ggtaaggggt aaagaagaaa ttttgaatgt attgggtgtt     300
gggtgttttt ttaaataagt aagaagggtg tattttgaag aattgagata gaagtttttt     360
tgggttgggt gtagttgttt gtggttgtaa ttttagtatt ttgggaggtt gaggtgggag     420
gattatttga ggttgggagt ttaagattag ttttattaat gtggagaaat tttgttttta     480
ttaaaaatat aaaaaattag ttggttatgg tggtatatgt ttgtaatttt agttgtttgg     540
gaggttgagg taggagaatt atttgaatta gggaggtaga ggttgtggtg agtagagatt     600
gtgttattgt tttttagttt gggtaataag agtaaaagtt tgtttaaaaa aaaaaaaaag     660
tttttttgat gtgattgttt ttttttaaat ttgtagattt ttttaagatt atgtttttta     720
gatattttaa agatttttaga agatatgttt tgggggtttt ggaagttata aggtaaatat     780
aatatatttt ttttttttgat tattaatttt attagaggat gtggtgggaa aattattatt     840
tgatattaaa ataaataggt ttgggatgga gtaggatgta agtttttttag gaaagtttaa     900
gataaaattt gagatttaaa agggtgttaa gagtggtagt ttagggaatt tattttggat     960
tttgggggag ggggtagagt tattagtttt tgtatttagg gatttttttga ggaaaagtgt    1020
gagaatggtt gtaggtaatt taggtgtttt ggtgttagga gggatgtatt taggtttgtg    1080
tgaagagagg gagaaagtga agttgggagt tgttattttt agatttgttg gaatgtagtt    1140
ggaggggggtg agttgggagt gtgtttgttt ttaattatag gagaaggagg aggtggagga    1200
ggagggttgt ttgaggaagt ataagaatga agttgtgaag ttgagatttt tttttattgg    1260
gattggagaa attaggggag tttttttgggt agttgtgtgt ttttttttat ggggtttttt    1320
attgtgttgt gtgtttggtt tttatttttt gtagtatttt gtgttttgtg ttttttttagt    1380
tgggtttagt tggagttatg gggttggagt tgtagtgagt attatggagt tggtggtttt    1440
gtgttgttgg gggttttttt ttgttttttt gtttttttgga gttgtgagta tttaaggtgg    1500
gtttggtgtg gggaggggat ggagtagtgg tgggattttg ttttgtggat gttttgttga    1560
ggttttgtgg ttggtggggt tagaggggtt tggatgagtt tttttatttt gaagttgtgg    1620
atagttgaga tgtttagggt agttgggttt tggggttttt gggtgggagg gggtagttat    1680
atggtagtgg tttgagatgg tttatttaag agattggtgt tttttaggt                 1729
```

<210> 71
<211> 1729
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 71

```
gtttggaaag tgttagtttt ttggatgggt tattttgagt tgttgttgtg taattgtttt      60
tttttgtttg agggttttag ggtttggttg ttttgagtgt tttgattgtt tataattttg     120
ggataggaga gtttgtttgg gttttttttgg ttttgttggt tgtgggattt tggtggggta     180
tttatagggt agggttttgt tgttgttttg tttttttttt atattagatt tattttgggt     240
gtttgtggtt ttgggggggta agagggtgag gaggagtttt tagtggtata aggttgttag     300
ttttatggtg tttattgtgg ttttggtttt atggttttgg ttggatttgg ttgggagggt     360
gtggggtgtg gggtgttgtg aggggtgggg gttgggtgtg tggtgtagta aagggttttg     420
tgggaagggg tgtgtggttg tttgggggggt tttttttggtt tttttggttt taatggaggg     480
gaattttagt tttataattt tatttttata tttttttaag tagttttttt tttttatttt     540
tttttttttt tgtgattggg agtaagtgtg tttttagttt gttttttttta attgtatttt     600
aataagtttg ggagtggtaa tttttagttt tatttttttt ttttttttgt gtaggtttgg     660
gtgtgttttt tttagtgttg ggatgtttgg gttgtttgta gttgttttta tatttttttt     720
tggagaattt ttaaatgtag aggttggtga ttttgttttt tttttttggag tttgggataa     780
atttttttagg ttgttatttt taatattttt ttaagtttta ggttttattt taaatttttt     840
```

tggggagttt gtattttatt ttattttaag tttatttgtt ttaatattaa ataatggttt 900
ttttattata tttttagta aaattgatag ttaaggaggg ggatgtgttg tgtttatttt 960
gtggttttta ggattttgg ggtatatttt ttggaatttt tgaagtattt gaaaagtatg 1020
attttaagag ggtttataaa tttgggagga gatagttata ttgaaaggat tttttttttt 1080
ttttaaatga atttttgttt ttgttgttta ggttggagag taatggtgtg atttttgttt 1140
attataattt ttgttttttt ggtttaagtg attttttgt tttagttttt tgagtagttg 1200
ggattatagg tatgtgttat tatgattagt taattttttg tatttttagt aaagataggg 1260
ttttttatg ttggtgaggt tggttttgaa tttttaattt taggtgattt ttttgtttta 1320
gtttttaaa gtgttggaat tataattatg agtaattgta tttagtttaa aaagattttt 1380
attttaattt tttaaaatgt attttttttg tttatttaag gaggtattta gtatttaatg 1440
tatttaaggt ttttttttg ttttttgttt tttattagtt tgtttaattt tattttttaa 1500
ttatatttta tttggagttt ttgattttat tttttaggtt tagtggtagg ggtggggatg 1560
gaaggaagat tttttttttt ttttttaatt ttaataagat attgtatggg atatatttat 1620
attaataaat tatttattgt ttatttgaaa tttaaattta attgggtttt tttattttta 1680
tgtgttaaat ttggtagttt tagttggaat gtttagtta agaatgtag 1729

<210> 72
<211> 12963
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 72

gttaggagtt ttagaaatag gggagagtta gaaagttggt tagatttatg ttttttaagt 60
gtagggttag ggttgagttt gtttttgggg taggtaagtt tttttgaatt tttgagggaa 120
gtagaagata taaattgtta gataaaatgt aagtttagtt taaaagggtt atgtgttgtt 180
ttttttagtt ttggggtatt ttttttttag aaaattggat tgttttatag tgaaaatttt 240
gggggtggtt agttttttgt tttgttgtta tttttattat ttatagtttt ttaagaagtt 300
tttaggttgg gtgttgaatt ttgattagga attattgaga aattgaggta gttgggagaa 360
gttgtagttt taagtgttga aaggaagatg ggggataata aatttgggtt gttaagtaaa 420
gggggtagag gtttggagaa gtgggtttta ggattagagg atagattgat tttatatttt 480
atttttttag attttatatt ttattgttat tattatttat gtgttttttt tgtttttttgt 540
agtgggtttt ttagaggtat tttttatggt ttttttagat tttaattttg gtttgtttgt 600
ttttttttta gaaaggtttt tgtttgtttt ttttgtagga aggtttgtat ttttagaaag 660
tttttgtttt ttgatttgag gatttaattt attaggggaa ttaaattttg tttttagggg 720
agtggagaga gaaattgggt tttttttttg tagtttttgg gatatagttg agttagttat 780
aggatttggg gataattggg gtggattttt ttttttggga ggtggtggta ttagtttaga 840
gtttgtattt ttatttattg gggaagtgtg gggagaagga tgggttggag ttgggttttg 900
gtttgaagga tagtagtttg gagttaatgg ttgagttttt aaagttttta tattgtagag 960
gaagtatagt ggagattagt tttagttagg atggttttga agtttttagg gatttgatgt 1020
agagttaaag aaatttattt gtgttttttt ttttttttgg gagtaggtag aagatttttg 1080
ggaggagagg tgaatagtgg atgttaattt ttttgaaagt attgtgtttt ttagtattgt 1140
gggttgttat gggtttttttg ttgttgtggg attttggttt atttttttgat tgggttgttg 1200
tattttggat tagattttgt gggtgattta tggaatttgt ggagttggga tgtgaaaggt 1260
tagaaggttt tttgttttta ttaagtttta gggtttttttg tggttgttgg gagttgtagt 1320
ttgaatgttt ttattttggt gagaagtgtt tatgtttttt ttattgagtt ttgtggtaat 1380
ttttaaagta tttgtattgt ttttttgttg tttgtagagg gtgtagtagg ttttgtattt 1440
tttttgtatt ttattttta ggttttagat ttgttttttt tatttaaaaa atatttatta 1500
ttgagttttt atttgttatt tagtattgat ataggtattt aggaatataa taatgaataa 1560
gatagtagaa aaattttata tttttataag gtttatgttt ttatgtattg aaagtaatga 1620
ataaataaat tttattagag tgataagggt tgtgaaggag attaaataag atggtgtgat 1680
ataaagtatt tgggagaaaa tgttagggtg tgatattatg gaaagttttt ttaaaaaatg 1740
atattttaat tgatgagaag aaaggattta gttgagagta aatgtaaaag tttttttttt 1800
tttatttttt atatttgata taatgtagga ttttttttaaa atgattttta ttaattttgt 1860
ttttatagtt ttggtttgta gaatttttta ttttaaaatg ttagtattta tggtattagg 1920
ttggtgagaa ttttgatttt gtattttttt ttttaatttt atttttttttg tttttttttgg 1980
taggtggatt atttgttttt atttgttatg gtgattgttt agttttgtgt taggagtttt 2040
gtaggggttg atgggattgg ggttttttttt ttttatgtgt ttaagattgg tgttaaaagt 2100
tttgagtttt ttaaaagttt agagttattg tttagggagt aggtagttgt tgggttttgg 2160
ggatattttg tgtttgggtt gggagtgtgt tttttatgat ggtgatatgt ttttttggat 2220

```
tgggtaagtt tttgattgaa tttgatgagt ttttttgag ttatgggttt ttggttttgt 2280
gtatttttag tttgggaaaa ttgttggggt tgggggtggg gtagtgggga tttagtgagt 2340
ttgggggtga gtgggatgga agtttggtta gagggattat tataggagtt gtattgttgg 2400
gagatttggg tgtagatgat ggggatgtta ggattatttg aatttaaagt tgaatgttta 2460
ggtagaggag tggagttttg gggaattttg agttggttta aagtgtattt ttttgtatat 2520
ttatttggtg ttgggtgtag ggaattttg aaataaaaga tgtataaagt attgaggttt 2580
gagatttttg gattttgaaa tattgagaat ttatagttgt atattttaga gtttatggta 2640
ttttagtgaa aattggggtt ttattttgaa atgattattt gggggtgatt tggggagttt 2700
aagttgttaa ggttttataa tttttggatt tttgtttttt ttggagtgat ttttttaggt 2760
agtttttggt tttgttagat ggagaaaatt taattgaagg ttgttagttg tggaagtgag 2820
aagtgttaaa ttaggggttt gtttgttagg ttgaggagga ttgttgtaat ttgagaggtt 2880
tggtagtttt gttattgttt ggttttatat ttatattttt gtttttgta gtagtatttt 2940
tggttttttt ttgttggagt agtttattat ttatttgatg agaggggagg agagagagag 3000
aaaatgtttt ttaggttggt ttttttatt tggtagaggg aggttgttat tttttgtttg 3060
tatttttttt tttggattat ttagttatgg tttttgtaaa ggtaggggta tttgttttga 3120
tgtaaatttt aattttttt tttttttgaa tggtgtgttt tattttttgg gttgtttgta 3180
atttaggtgg atgttattat ggtgtagata gggagggaaa gaagtgtgta gaaggtaagt 3240
ttggaggtat ttttaagaat gagtatattt tatttttttg gagaaaaaaa aaaaagaatg 3300
gtatgtttga gaatgaaatt ttgaaagagt gtaatgatgg gttgtttgat aatttgttgg 3360
gaaaaataat ttatttgtta tttagttttg ggttaggtta ttttagtttt agatgtaggt 3420
tgaatgttgt gaagtggaag gggtgggttt gtaggtgttt gtgtggtttt ttgtgtagtt 3480
tttggtttga gttggttttt tttggtagga ggtggaattt gaatttattt tttttgttgt 3540
tttatttttt agtttgtggt tgttttattt tgtagttttt ttttatgtat ttgttgtgta 3600
ttggttattt tgtgttgtat ttatgttatt tttttttaa attgaggtgg tatttatata 3660
tagtgttagt gtatatagta agtgtatagg aagatgagtt ttggttttta attgttttgt 3720
gatgtttatt aagttataga ttttttttat tgttttagaa atgttttatt atgttttttt 3780
ttagttgatt tttgatttta tttttatttt gatttttata attattttgt ttgttggaga 3840
atttatatat gaatggaatt aggatgggtg ttgtggttta tgtttgtatt ttggtttatg 3900
tttgtatttt gggaggttga ggtgggtgga ttatttgagg ataggagttt tagattagtg 3960
tggttaatgt ggtgaatttt tgtttttatt aaaaaatata aaaattagtt gggtgtggtg 4020
ggtgtttgta atttagtta tttgggaggg tgaggtagga gaattgtttg aatttgggag 4080
gtagaggttg tagtgagtta agattgtgtt attatatttt agtttgggtg ataagaatga 4140
aatttgtttt taaaaaaag gggggaatta tatattatgt gtttattttt gttgggtttt 4200
tgtttttttaa tgtattgttt gatatttgtt tatgttgtat atattagtat tttgtttttt 4260
tttatttagt atagtttatt gattgtatat ttgttttttt gatggttttt tgagttgttt 4320
tttatttgtg gttatgaaat aaagttgtta taaatatttt tgtataattt tttttgtgat 4380
tatatgtttt tgtgtttttt ggagaaatat ttaggagggg aattgtggag gaagtaaaaa 4440
gtagttgtat tttgaatttt tttagaagtt ttgagttttt tagagtggtt gtattatttt 4500
atattttaat tagtaaggta tgggagttat tatggttgtg ttatagtttt ttggatatta 4560
ggtatgttag tttttttaat gtggtatatt tttgtggttg taatttatag tttttttattg 4620
attaaggatg tttagtattt ttttatgtgt ttattggtta tttgtatttt gtttgtaaag 4680
tagtttttg agtttttat ttgttatttt ggttttttg tttgttttta ttgtttagtt 4740
gtgggattgt tttatatttt ttggatataa gtttttatta gatttatgag ttgtgaatgt 4800
ttttttttga tttgttgtgg gtttatttgt ttgttttata gagtttatag aattttaaga 4860
ggagtggatt aattttttttt atgtttagta tttgttttgt tttgtttagg atattttttt 4920
ttttttttt aattttaggg ttatgaagat ataattttat atttttttt aggattttta 4980
tggtggtaag ttttatagta aggtttttaa gttattaatt aatttttaaa attaattgtt 5040
tatggtgtga ggtgtaggag ttagttttg gtattttttt tgtatggaaa tttagttatt 5100
ttgttttat ttgttgaaat aggtttttt tttttattga atgtttttaa ttttaattat 5160
tttatagttg gagtataggg ttattatttt agtgttattt tttttttttt tttgttaatt 5220
tttgagatag ggatttatat tgttgtttag gttagagtat aatggtataa ttaaggttta 5280
ttgtagtttt gaatttttgg gtttaagtag ttttttagta gttttatgag tagttgggat 5340
tattttatta tatttagtta attattttat tttttgtat tgataggatt ttattatgtt 5400
gtttaggttg gttttaaatt gttggtttta agtttttatt ttattttggt tttttaaagt 5460
gttgggatta taggtgtgag ttattatgtt tgattttta gtgttatttt ttatttattt 5520
tttttgtttt ttgttttttt taaatgttgg aggaagaaat agtatttatt ttatataaat 5580
tttttagaaa atagaggaat agattgggtg tggtggttta tatttgtaat tttagtattt 5640
tggtatgttg aggtagggga ttatttgagg ttgggagttt gagattagtt tggttaatat 5700
ggtgaaattt tatttttatt aaaatataaa agtagttagg tgtgtattat atttgtaatg 5760
ttagttattt aggaggttga ggtataagaa ttttttgaat ttgggaagtg gaggttgtag 5820
tgagttgaga ttgtgttatt gtattttagt ttgggtaata gagtgagatt ttgttttaga 5880
aaaaaaaaga aagaaagaaa aaatagagga atattttta atttgttttt gaagttagga 5940
taattttggt attaaaatta aataaggata ttataagaaa agaaaatata gattaatatt 6000
```

tttgttagta tagatatgta atagttaatt aattttagta aattaaattt ggtaatatag 6060
aaaaaaggat aaataggtta gttgtggtgg tttatgtttg taattttagt attttgggag 6120
gttgaggtag gtagattatt tgaggttagg agtttgagat tagtttgatt aatatggtga 6180
aattttgttt ttaataaaaa tataaaaatt aggttgggta tggtggttta tgtttgtaat 6240
tttagtattt tgggaggttg aggtgggtag attatgaggt taggagttta agattagttt 6300
gattaatgtg gtgaaatgtt atttttatta aaaatatgaa aattagttgg tgtggtggta 6360
tttgtttgta attttagtta tttaggaggt tgaggtagaa ttgtttgaat ttgggaggta 6420
gaggttgtag tgagttaaga ttgtgttatt gtattttagt ttgggtgata gagtaagatt 6480
ttattttaaa aaaaaaaaaa attagttggg tatggtggtg ggtatttgaa attttagtta 6540
tttgggagtt tgaggtagga gaattgtttg aatttaggag gtagaagttg tattgagttg 6600
ggattatatt attgtatttt agtttgggta atagagtgag atttttatttt aaaaaaagaa 6660
aaagaaaaag gataaatata ttttaattaa ataatgttta ttttatgatt gtagttgatt 6720
taatatttaa aaattggttt ggtgtagtag tttaggtttg taattttaat attttaggag 6780
gttgaggtag gaagattttt tgagtttagg attttaagat tagtttgggt aatatagtta 6840
gattggtttt tattgggggg aaaaaaatta gtttgtgtaa tttattatat taataaaggg 6900
aaatataaaa atttatgat tattttaata gatgtagtaa aagtagttaa tgatattaat 6960
atatatgtat gattataaat taattaattt tttagtaaat tagggaaagg aaatttaatt 7020
agtttgataa tagggtgttt atagttggag ttttattagt agtatatata atggtagaaa 7080
atttagtgtt gttgggggtg gtggtttatg tttgtaatgt tagtgttttg ggaggtttag 7140
gtgggtggat tatgaggtta ggagattgag attgttttga ttagtatgtt gaaattttgt 7200
ttttattaaa aatataaaaa taaaaaatta gttgggtatg gtggtgggtg tttatagtgt 7260
tagttatttg ggaggttgag gtgagagaat ggtgtgaatt tgggaggtgg agtttgtaga 7320
gtttagattg tgttattgta ttttagtttg ggtgatagag tgagattttg ttttaaaaaa 7380
aaaaaaaaaa aaaaaagaaa agaaaattta atgttttttt ttttaagatt aggaattaga 7440
aaaggatttg atttttataa tgttgatatt atattggagg ttttaattag gtaagaaaaa 7500
gaaataatga gggttgggtg tggtggttta ggtttgtaat tttagtattt tgggaagttg 7560
agatgggtgg attatgaggt taggagattg agttattttg gttaatatgg tgaaattttg 7620
tttttattaa atatataaaa aattagttgg gtgtggtggt gggtgtttgt agttttagtt 7680
atttgggagg ttgaggtagg agaatggtgt gaatttaggg ggtggagttt gtagtgagtt 7740
gagattgagt tattgtattt tagtttgggt gatagagtaa gattgtgttt taaaaaaaaa 7800
aaaagaaaaa gaaataatga ttagtggttt gatgttttat gttagtaatt ttagtatttt 7860
gggaggttga ggtgggtaga ttatttgagg tttggagttg gagattagtt tgataaagat 7920
ggtgaaattt tgtttttatt aaaatattaa aaaaatagtt aggtgttggt tgggtatagt 7980
ggtttatgtt tgtaatttta gtattttggg aggttgaggt gggtggatta tttgaggtta 8040
ggagtttaat attagtttgg ttaatatggt gaaattttat ttttattaaa aatataaaat 8100
tagttgggtg tagtggtggg tgtttgtaat tttagttatt tgggaggttt aggtaggaga 8160
attgtttgaa tttgggaggt ggaggttgta gtgagttgag attgtattat tgtattttag 8220
tttgggtgat aaaagtaaaa atttgttttt aaaaaaaaaa gaattagtta ggggtagtgg 8280
tgaatgtttg tagttttagt tatttaggag gtagaggtag gagaattatt tgaattttgg 8340
aggtagaggt tgtagtgagt tgagattgtt ttattgtatt ttagtttagg tgagaagagt 8400
aaaattttat gttaaaaaaa aaaaaaaaaa aggaaagaaa aaaaataatg attagaaagg 8460
aagaaattaa atatatttat agttagtatg attttatata tattatggtt ttaatggggt 8520
taggtgtggt ggtttatgtt gtaattttag tatttttagg aggttgaggt aggtggtttt 8580
tttgggatta gttggttaat atggtgaaat tttaatttta ataaaaatat aaaaaattag 8640
ttaggtgtgg tgagggtatt tttaatttta gttatttagg aggttgaggt aggagaattg 8700
tttggatttg ggaggtagag gttgtagtga gttgagattg tgttattgta ttttagtttg 8760
ggtaataaga gtgaaatttt ggtagggtgt ggttttatgt ttgtaatttt agtattttgg 8820
gaggttgagt taggttgatt atttgaggtt aggagtttga gattaattta atatggtgaa 8880
attttgtttt tattaaaaat ataagaatta gttgggtgta gtggtgggtg tttgtaattt 8940
tagttatttg ggaggttgag atagaagaat tgtttgaatt taggaggtgg aggttgtagt 9000
gagttgagat tatgttattg tatattatgt tgggtaatag agtgagattt tgttttaaaa 9060
aaaaaaaaaa gatgaaattt tattttaaaa aaaaaaaaaa gttttaatgg aaaatttata 9120
aaaagttatt aaaattaata aataaatata gtagggttgt aggttatagg gtaatatagt 9180
tattttttta tttgtagggg tttggttttg ggattttttta tatattaaat ttatagatgt 9240
ttaagtttta tatataagat ggaatagtat ttaatttata tatatttttt tatatagttt 9300
aaattattta gattatttat attattttta tataatgaaa atgttaatgt atatgtaagt 9360
atgtatgtaa gtatttgtat tatattgttt agggaattat tggatagata ggtttttaag 9420
attgatatta gtagttattg ttaagatttt ggttaggttt gtttttgttt ggggttttag 9480
ttgattttat tgttttttta tttagttaag ggtatttgta tttttttttgg ttttttggtt 9540
atttggaagg tttagtttag tttggtatat ttgtattttg gtttattgat gttggtattt 9600
ttgggaaggt tttgttttga aaaatatgga gatttagtt gttattgaag atttgagaga 9660
taaagatagg gagatttgtt tgtagatttg tgttttttta agtgggattg agattttggg 9720
ttttttattt taggatagta ttttttggtt tgttgattga atagattttt gaaggaggtg 9780

tagttgtatt ttaggagtgg gggtgggagt agtattattg atttgtatta ataattatat 9840
agttttttt agaataataa tatagaataa gtgaaataga ataattgtag aaagagttaa 9900
tttttgttga gtttttattg tgtgtttagt attttttta attttatatt ttttataata 9960
tatagagtat taggtaggtg gggtttgggg gtttatgttt gtaattttag tattttagga 10020
ggttaagggg ggtggattat ttgaggttgg gagtttaaga ttagtttgat taatatggtg 10080
aaattttgtt tttattagaa gtataaaatt agttaggtgt ggtggtatat gtttgtagtt 10140
ttagttattt agtaggttga ggtaggagaa ttatttgaat ttgggaggag gttgtagtaa 10200
gtggagatag tgttattgta ttttagtttg ggtaataaga gttgagattt tgttttaaaa 10260
taaaataaaa taaaataaaa taaaataaaa taaaataaaa aaagaaaaga gtttgttatt 10320
aaaggagttg tttggtaggg gatgttttgt tagtgtaaat aatagaaaag tgggttgggt 10380
atagtggttt atgtttgtaa ttttagtatt ttgggaggtt aaggtgggtg gattatttga 10440
agttgggagt ttaagattag tttgattaat atggagaaat tttgttttta ttaaaaatat 10500
aaaattagtt gggtgtagtg gttgatgttt gtaattttag ttatttggga ggttgaggta 10560
ggagaattgt ttgaatttgg gaggtagagg ttgtggtgag ttgagattgt attattgtat 10620
tttagtttgg atgagagtaa aattttgttt taaaaaaaaa aaaaaataga aaagtgtaat 10680
aaatatttat agtaggtatg ttttttagta aatttgatga taaatttggt ataaagaaag 10740
agagtatttt tgaaaaaaaa aaaaagaaaa agaaagagag tattttgttt gggtaatata 10800
gtgaaatttt gtttttataa aaaaatttaa aaattggttg ggtgtagtgg tttatatttg 10860
taattttagt attttgggag ttggaggtgg gaggattatt tgaggttagg agtttgaaat 10920
tagtttggtt aatatggtaa aattttattt ttattaaaaa tataaaaaat taattaggtg 10980
tattggtggg tgtttgtaat tttagttatt taggaagttg aggtaagagg attgtttgat 11040
attgggaggt ggaggttata gtgagttgag attatattat tgtattttag tttgggtgat 11100
agggtgagat tttgttttta aaaaaaaaaa gaaaaagaaa aagattaaaa aattagttag 11160
gtaggttttt gtggttttag ttatttggga ggttgaggta ggagaattat tgagtttagg 11220
agtggtaggt tgtagtgagt tatgattgta ttattgtatt ttagtttggg ttttaaagta 11280
agattttgtt ttaaaagaaa aaagaaagaa agaaagaata tggtgggtta ggtatagtgg 11340
tttatatttg taattttagt gttttgagag gttgaggtag gtggattata aggttaggag 11400
ttttatatta gtttggttaa tatggtgaaa ttttgttttt attaaaaata taaaaaatta 11460
gtaggtaggg tggtaggggt ttgtaatttt agttatttgg gaggttgagg taggagaatt 11520
gtttgaaatt agaaggtaga ggttgtagtg agtttagatt gtattattgt attttagttt 11580
gggtgaaaag agttaaattt tattttaaaa aataaataaa aaaataaaat aaaaaaaaat 11640
atggtagttt ttgaaagttt gtttgggaga aggtgtgatg atggttgtat aattttgtgt 11700
aagatgttgg tttatatagg ggttgttttt tgtttttttt tgttttttta attttttata 11760
taataggttt gtgtgttatg tatatttatt gagtttaagt aggtgtaagg tattgtgatt 11820
taatattttg gttagtaaga taataagata gattattgtt ttgtttttag gaagtgtata 11880
tgttattaga ggaaatagat aaaataaata aggaaaagta ttagataatg taagtgttat 11940
gagaatgtaa atgaggtgat gtgaattaaa ataggatgat ttaagtttgt atggaaggtt 12000
tttattttta tgtttttggt tagttaagga attattagtt gattagtaga gaagggtagt 12060
ttgtttagtt agagttttg gggaagaggg agtggttgtt aagagatgag attaaagaag 12120
ttgagatggg ttttttgtga ggggggggttg taatgtaggg ttgaggagtg tttgaagaga 12180
atgggtaggt gagtggtgag atagttgttt ttttagaagt tttgtagtga aaggaattaa 12240
agaaatggag ttgtgtatta ggtggggaag ggtgggggtt aagggggtgt tttttttat 12300
atagagattg taggttgaga atgattatat ttttgttaat aggaggtggg agtagggtat 12360
ggtagtttat atttgtaatt ttggtatttt aggaggtgga ggtgggttga ttatttgaag 12420
taaggagttt gagattagtt tggttaatat gtaaagtttt gtttttatta aaaatataaa 12480
aattagttgg gtgtggtggt atttgtttgt aattttagtt atttgggaga ttgaggtagg 12540
agaatggttt gaatttggaa ggtagaggtt gtagtgagtt gagattatgt tattgtgttt 12600
tagtttaggt gatagagaga gattttattt taaaaaaaaa aaaaaatata ggaagggagt 12660
tgggaatagg gtgtatattt aggaagtttt ggggatttag tggtgggaag gttggaagtt 12720
tttttttgat tgtttttttt ttaaagaagt gtatggttgg tgtggggtgg ggtaggagtg 12780
tttgggttgt ggtgaaatat tggaagagag aatgtgaagt agttattttt tttttgtttt 12840
ataggaagtt gagttgtttt agatattggt atggtgttgg gggagggggt tttttttttg 12900
taggtttagg tgatttaggg ttggaagtgt tttatgttgg atttttattt tttttttgt 12960
agt 12963

<210> 73
<211> 12963
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 73

```
gttgtaagag gaaaagtggg gatttagtat gagatatttt taattttggg ttatttgggt      60
ttgtagagaa ggaatttttt tttttaatat tatgttagtg tttgagatag tttggttttt     120
tgtggagtag gaaaagaatg gttgttttat attttttttt ttaatgtttt attataattt     180
aagtattttt gttttatttt atattagtta tgtatttttt tgaggaaaag ataattagag     240
agggattttt aatttttttta ttattaaatt tttaagattt tttaaatgtg tattttattt    300
ttaatttttt ttttgtattt tttttttttt ttgagatgga gttttttttt gttatttagg     360
ttggagtata gtggtatgat tttagtttat tgtaattttt atttttgggg tttaagttat     420
tttttgtttt tagtttttttg agtagttggg attataggtg agtattatta tatttagtta    480
atttttgtat ttttagtaga gatagggttt tgtatgttgg ttaggttggt tttgaatttt     540
ttattttagg tgattggttt gtttttgttt ttttaaagtgt taagattata ggtgtgagtt    600
attgtgtttt gtttttattt tttgttaata aggatatagt tatttttagt ttgtaatttt     660
tgtatgggga aggatatttt tttggttttt attttttttt atttgatata tggttttatt     720
tttttgattt tttttattgt aaagtttttg gaagaataat tgttttattg tttatttgtt     780
tatttttttt ggatattttt tagttttgta ttataatttt tttttatgaa gggtttgttt     840
tggttttttt aattttattt tttaataatt attttttttt ttttaaaagt tttagttaga     900
tgggttgttt tttttgtta attaattggt ggtttttttgg ttagttagga atatgggggt    960
aggggttttt tgtgtagatt taagttattt tattttaatt tatattattt tatttgtatt    1020
tttatagtat ttatattgtt tgatattttt ttttgtttat tttatttgtt tttttttaata   1080
gtatatatat tttttaaggg tagggtagtg atttattttg ttgttttgtt gattaaagta    1140
ttagattata atgttttgta tttgtttggg tttaataaat gtgtataata tataagtttg    1200
ttatatgaga ggttaagaga gtgagaaaga gtaaggggta gtttttgtgt ggattagtat    1260
tttgtatgaa gttatgtaat tattattgta tttttttttta gataagtttt taaaggttgt   1320
tatgtttttt tttgttttgt tttttttgttt gtttttttgag atggagtttg gttttttttg  1380
tttaggttgg agtgtagtgg tgtagtttag gtttattgta atttttgttt tttggtttta    1440
agtaattttt ttgttttagt tttttgagta gttgggatta taggttttta ttattttgtt    1500
tgttgatttt ttgtattttt agtagagata gggttttatt atgttggtta ggttggtgtg    1560
gaatttttga ttttgtgatt tatttgtttt ggttttttaa agtgttggga ttataggtgt    1620
gagttattgt gtttggtttg ttatgttttt tttttttttt tttttttttt tgaggtaggg    1680
ttttgttttg aagtttaagt tagggtatag tggtgtaatt atggtttatt atagtttgtt    1740
atttttgggt ttagtgattt ttttgtttta gtttttttaag tagttgggat tatagaggtt   1800
tgtttggtta atttttttagt tttttttttt tttttttttt ttttggagat ggagttttgt   1860
tttgttattt aggttagagt gtagtggtgt gattttgatt tattgtaatt tttatttttt    1920
agtattaagt gatttttttg ttttaatttt ttgagtagtt gggattatag gtgtttatta    1980
atgtgtttga ttaatttttt gtatttttag tagagatggg gttttgttat gttggttagg    2040
ttggttttga atttttgatt ttaggtgatt tttttgtttt tgatttttaa agtgttggga    2100
ttataggtgt gagttattgt atttggttaa tttttgagtt tttttgtaga ggtagggttt    2160
tattatgttg tttaggtagg atgttttttt tttttttttt tttttttttt ttagggatgt    2220
tttttttttt tatgttaaat ttgttattag atttgttaag aaatatgttt attgtaagtg    2280
tttgttatat ttttttgttt tttttttttt ttgagataga gttttgtttt tgtttaggtt    2340
ggagtgtaat ggtgtgattt tggtttattg taatttttgt tttttaggtt taagtgattt    2400
ttttgtttta gtttttttgag tagttgggat tataggtatt ggttattgtg tttggttaat   2460
tttgtatttt tagtagagat ggggtttttt tatattggtt aggttggttt tgaattttta    2520
attttaggtg atttgtttgt tttggttttt taaagtgttg ggattatagg tatgaattat    2580
tgtgtttagt ttattttttt gttgtttgta ttgataaaat atttttttatt aaatagtttt   2640
tttaatggta ggtttttttt ttttttttatt ttattttatt ttattttatt ttattttatt   2700
ttattttgag atggagtttt agttttttatt gtttaggttg gagtatagtg gtattatttt   2760
tgtttattgt aatttttttt tggatttaaa tgattttttt gttttagttt gttgagtagt    2820
taggattata agtatgtgtt attatatttg gttaattttg tatttttagt agagatgggg    2880
ttttattatg ttagttaggt tggttttgaa tttttgattt taggtgattt attttttttg    2940
gtttttttaaa gtgttgggat tataggtgtg agtttttaag ttttgtttat ttagtatttt   3000
atgtattatg ggaaatgtag agttgaggaa agtgttgggt atatagtaag agtttaataa    3060
aggttagttt tttttgtaat tgttttattt tatttgtttt atattattat tttagagaga    3120
attgtgtgat tgttagtgtg gattagtggt attgttttta ttttttatttt taaaatgtaa   3180
ttatattttt tttagggatt tatttagtta ataggttagg aggtgttgtt ttgaaatggg    3240
gggtttaaag ttttaatttt atttggaggg atataggttt atagataggt tttttttgttt   3300
ttatttttta aatttttagt agtaattaaa atttttgtgt tttttagagt aggatttttt    3360
taggggtatt agtattagtg ggttaggata taaatgtgtt aggttgaatt aggtttttta    3420
aatggttagg gagttaagag aaatgtaggt gtttttggtt gggtgggaag gtaatgagat    3480
taattgagat tttaaatagg ggtaggtttg attagaattt taatagtggt tgttggtatt    3540
agttttgaag gtttatttgt ttagtgattt tttaaataat atagtataag tatttatata    3600
tatatttgta tgtatattag tatttttatt gtatgggggt aatgtaagta atttagataa    3660
```

tttaaattat atgggaggat atgtgtaggt taaatattat tttgttttat atatgggatt 3720
tagatatttg tgggtttggt gtgtgaggag ttttagaatt aagtttttat agatagaggg 3780
ataattatat tgttttgtaa tttgtaattt tgttatattt atttattagt tttggtagtt 3840
ttttatggat tttttattag gatttttttt tttttttgag atagagtttt attttttttt 3900
ttttttttgag atggaatttt gttttgttgt ttggtgtggt gtgtaatggt atgattttag 3960
tttattgtaa ttttttatttt ttgggtttaa gtaatttttt tgttttagtt ttttaagtag 4020
ttgggattat aggtgtttat tattatattt agttaatttt tgtattttta gtagagatgg 4080
ggttttatta tgttaggttg gttttaaatt tttgatttta ggtgattggt ttggtttagt 4140
tttttgaagt gttgggatta taggtgtaag attatatttt gttggagttt tatttttgtt 4200
gtttaggttg gagtgtaata gtgtgatttt ggtttattgt aatttttgtt ttttaggttt 4260
aagtaatttt tttgttttag ttttttgagt agttgggatt agaggtgttt ttattatgtt 4320
tggttgattt tttgtatttt tattagagtt ggggttttat tatgttggtt agttggtttt 4380
agggaagtta tttgttttag tttttttaaaa gtgttaggat tatagtatga gttattatgt 4440
ttggttttat taggattatg gtatgtatag aattatattg gttgtgaatg tgtttgattt 4500
ttttttttt aattgttatt ttttttttt ttttttttt ttttttttt gatatggaat 4560
tttgtttttt ttgtttaggt tggagtgtaa tgggataatt ttggtttatt gtaatttttg 4620
tttttggggt ttaagtgatt tttttgtttt tgtttttttga gtagttggga ttataggtgt 4680
ttattattat ttttggttaa ttttttttt tttgagatgg agtttttgtt tttgttattt 4740
aggttggagt gtaatggtgt aattttggtt tattataatt tttgtttttt aggtttaagt 4800
gatttttttg tttaagtttt ttaagtagtt gggattatag gtgtttgtta ttatgtttgg 4860
ttaatttttgt atttttagta gagatggggt tttattatgt tggttaggtt ggtgttgaat 4920
ttttgatttt aggtgattta tttatttttgg tttttttaaag tgttggggtt ataggtatga 4980
gttattgtat ttggttaatg tttggttatt tttttaatat tttaatagag atgaggtttt 5040
attatttttg ttaggttggt ttttaatttt agattttagg tgatttgttt attttggttt 5100
tttaaagtgt tgggattatt ggtgtgagat attgggttat taattattat ttttttttt 5160
ttttttttt ttgagatata gttttgtttt gttgtttagg ttggagtgta gtggtttgat 5220
tttagtttat tgtaagtttt gttttttgag tttatgttat ttttttgttt tagtttttttg 5280
agtagttggg attataggtg tttgttatta tgtttggtta atttttttgta tatttagtag 5340
agatagggtt ttattgtgtt agttaggatg gtttgatttt ttgattttgt gatttatttg 5400
ttttggtttt ttaaagtgtt gggattatag gtttgagtta ttgtatttgg tttttattat 5460
ttttttttt tgtttggtta aaatttttag tatggtatta atgttgtgag agttaaattt 5520
ttttttagtt tttgatttta gaggaaaaag tgttgagttt ttttttttt ttttttttt 5580
ttttttttttg agatgaagtt ttattttgtt atttaggttg gagtgtagtg gtatgattta 5640
ggtttgtaa gtttttgtttt ttgggtttat gttatttttt tgttttagtt ttttgagtag 5700
ttggtattat aggtgtttgt tattatgttt ggttaatttt ttgtttttgt atttttagta 5760
gagatggggt tttagtatgt tagttaggat agttttgatt ttttgatttt gtgatttgtt 5820
tgtttaggtt ttttaaagtg ttggtattat aggtgtgagt tattgttttt agtagtattg 5880
agtttttat tattatgtat gttgttagtg gaattttgat tgtggatgtt ttgttattaa 5940
attagttaag ttttttttt ttagtttgtt aggaggttgg ttggtttgta attatgtata 6000
tgtgttgata ttattaattg tttttgttat atttgttgaa atgattatag ggtttttatg 6060
ttttttttttg ttaatgtggt gaattatata gattgatttt ttttttttta gtaaagatta 6120
gtttgattat gttgtttagg ttggttttga aattttgggt ttaagagatt tttttgtttt 6180
agttttttaa aatgttggga ttataggttt gagttattgt attaggttaa tttttgaatg 6240
ttgaattagt tataattatg agataaatat tatttggtta gaatgtattt attttttttt 6300
ttttttttt tttgagatgg agttttattt tgttgtttag gttggagtgt aatggtgtga 6360
ttttagttta gtgtaatttt tgtttttttgg gtttaagtga ttttttttgtt ttagattttt 6420
gagtagttgg gattttaggt gtttattatt atgtttagtt aatttttttt ttttttgaga 6480
tgaagttttg ttttgttgtt taggttggag tgtagtggta tgattttggt ttattgtaat 6540
ttttgttttt tgggtttaag taattttgtt ttagtttttt gagtagttgg gattataggt 6600
aggtgttatt atattggttg atttttgtat ttttagtaga gatggtgttt tattatattg 6660
gttaggttgg ttttgaattt ttgattttgt gatttgttta ttttggtttt ttaaagtgtt 6720
gggattatag gtgtgagtta ttgtgtttag tttgattttt gtatttttat tagaaatggg 6780
gttttattat gttggttagg ttggttttaa atttttgatt ttaagtgatt tgtttgtttt 6840
agttttttaa agtgttggga ttataggtgt gagttattgt gattggttta tttatttttt 6900
tttttatatt attaggtttg gtttgttaaa attggttagt tgttgtatgt ttatgttaat 6960
aggaatattg gtttatattt ttttttttta taatgttttt gtttggtttt ggtattagga 7020
ttattttggt tttgaaaata agttgggaaa tatttttttta ttttttttt ttttttttt 7080
tttttttgaga tagggtttta ttttgttgtt taggttggag tgtagtggtg taattttggt 7140
ttattgtaat ttttgttttt taggtttaag ggatttttgt gttttagttt tttgagtaat 7200
tggtattata ggtatggtgt atgtttagtt atttttgtat tttagtagag atggggtttt 7260
gttgtgttgg ttaggttggt tttgaatttt tgattttaaa tgatttttttg ttttagtgta 7320
ttaaagtgtt gagattatag gtatgagtta ttgtgtttag tttgtttttt tgtttttttga 7380
agagtttgtg taagatgggt attgtttttt tttttaatgt ttaaagagag tagagaatag 7440

aggagataaa tagaaaatag tattaagagg ttaggtatgg tggtttatat ttgtaatttt 7500
agtattttgg gaggttgaga tgggatgaaa gtttgaggtt agtagtttga gattagtttg 7560
ggtaatatag tgagattttg ttaatataaa aaaataaaat agttagttgg gtgtggtgga 7620
gtaattttag ttatttgtga ggttgttaga ggattgtttg agtttagggg tttgaggttg 7680
tagtaagttt tgattgtgtt attgtatttt agtttgggta atagtgtgag tttttgtttt 7740
aaaaattaat aaagaaaaaa agaaaatagt attaaaatgg tagttttata ttttaattgt 7800
aaaataatta aaattaaaag tatttagtag agaaaggaag tttattttaa taagtggaga 7860
tagaataatt ggatttttat ataggaaaga tattagagat tgatttttat attttatatt 7920
ataaataatt aattttaaga attaattaat ggtttaagga ttttattgta aaatttatta 7980
ttataaaggt tttaaaagaa aatgtaagat tatattttta tgattttggg gttaaaaaaa 8040
aaaaaaaaga tgttttaaat aggataaggt aaatattgaa tataaaaaag attaatttat 8100
ttttttttaag atttgtaaa ttttgtaaag taaataaata ggtttgtaat agattagaag 8160
aaaatattta tgatttatgg atttgataag gatttgtatt tagaaagtat aaagtagttt 8220
tataattgaa taataaaaat aaataaaaaa attaaaataa taggtaaaag atttgaagag 8280
ttattttata aataaaatat gaatggttaa taggtatatg aaaaaatgtt gaatattttt 8340
agttaataga gaattgtaaa ttataattat aaggatatat tatattagaa agattgatat 8400
atttaatgtt tggaaggttg tggtataatt ataataattt ttatattttg ttagttggag 8460
tgtaaaatgg tataattgtt ttggaaaatt tagagttttt gaaaaagttt aaaatatagt 8520
tattttttat ttttttttata attttttttt taagtatttt tttaagaaat atgaaaatat 8580
atgattataa aaagaattgt ataagaatgt ttatagtagt tttattttat aattgtaaat 8640
gggaaataat ttaaaaggtt attaaaagga tggatatata attgatggat tatattaaat 8700
gaaaaggagt aaaatattga tatatataat atgaatgaat gttagatagt atattgaagg 8760
atagaagttt gataaaaatg agtatataat gtatgatttt tttttttttt ttgagatgga 8820
gttttgtttt tgttgtttag gttggagtgt agtggtatga ttttggttta ttgtaatttt 8880
tgtttttttgg gtttaagtga ttttttttgtt ttattttttt gaatagttgg gattataggt 8940
atttattatg tttagttaat ttttgtattt tttagtagag atggggattt attatgttgg 9000
ttatgttggt ttggaatttt tatttttaag taatttgttt gttttggttt tttaaagtgt 9060
aggtgtgagt taaagtgtag gtgtgagtta tagtgtttat tttgatttta ttttatatga 9120
agtttttttaa taggtaaaat ggttatggag attaaaataa aggtggggtt gggaattgat 9180
tgggaagaga tgtgatgaaa tgtttttggg atgatgaaaa gggtttgtga tttggtaggt 9240
attatggagt ggttaggggt taaaatttat tttttttgtgt atttgttgtg tgtattggtg 9300
ttgtgtgtaa atgttatttt gatttaggaa aaagatgatg taagtatggt ataaagtggt 9360
tggtatgtgg taggtgtatg ggaagaaatt gtggaatgaa ataattgtga gttaagagat 9420
ggggtagtgg gagaaatgaa tttgagtttt gtttttttatt aggaagaatt ggtttgggtt 9480
gagggttgta tggaggatta tatggatgtt tgtgggtttg ttttttttgt tttatgatgt 9540
ttagtttgtg tttggaattg gaatggttta gtttaaagtt agataatagg tagattgttt 9600
tttttgataa attattaaat gatttattat tgtatttttt taaaatttta tttttagatg 9660
tattattttt ttttttttt ttttgggaag atgagatatg tttattttttg aaagtgtttt 9720
tgggtttgtt ttttgtatat ttttttttt ttttgtttat gttatggtag tgtttgttta 9780
ggttgtaggt gatttggggg gtggggtata ttatttaaag aaggggaggg attgaggttt 9840
gtattaaaat aaatattttt gtttttgtaa aggttataat taagtaattt agaaaaagaa 9900
atgtaggtgg agaatagtag ttttttttttg ttaagtaaga ggaattggtt taaaggatat 9960
tttttttttt ttttttttt ttttattggg tgaatagtga gttgttttgg taaaaagaaa 10020
ttggaaatgt tgttgtaaga ggtagaaatg taaatgtgga gttaaataat aataggggttg 10080
ttgggttttt tagattgtga tggtttttttt tggtttggtg ggtaaatttt tggtttagta 10140
tttttttattt ttatgattga tagtttttaa ttggattttt tttatttagt ggagttgggg 10200
gttgtttgga aagattgttt taggaaggat aaaggtttgg aagttgtggg attttagtag 10260
tttgggtttt ttggattatt tttaaatgat tattttggaa tggagtttta gtttttatta 10320
ggatgttatg ggttttaaaa tatatagtta tgagttttta atgttttgag atttaaaagt 10380
tttagatttt aatgttttgt gtattttttta ttttagggat tttttatgtt tagtattggg 10440
tggatgtgta aagaagtatg ttttaggttg gtttaaggtt ttttaaagtt ttattttttt 10500
gtttaggtgt ttaattttga gtttggatgg ttttaatatt tttattattt atatttaggt 10560
tttttaataa tgtaattttt atgatgattt ttttagttaa gtttttattt tatttatttt 10620
taaatttgtt aagtttttat tgttttattt tttagttttag tgattttttt gagttgaaaa 10680
tatatggagt tgagagtttg tgatttagag aggatttatt aagtttagtt aggagtttat 10740
ttaatttagg gaagtgtgtt attgttgtgg aaagtatgtt tttagtttga atgtaaagtg 10800
tttttggagt ttagtagtta tttgtttttt ggatggtggt tttagatttt tgagaagttt 10860
aaaattttta gtgttagttt tgagtatatg ggaggggaaa attttaattt tattaatttt 10920
tgtgaggttt ttggtataaa gttggatagt tgttatgata agtaagggta agtaatttgt 10980
ttgttggagg aagtaaagga aatggagttg gggaggaggg tgtagagtta ggattttttgt 11040
tgatttggtg ttgtagatat taatattttg gggtggaaaa ttttgtaagt tagagttgtg 11100
agggtagaat tggtggaaat tattttggag gaattttgta ttgtgttaaa tatgaagggt 11160
ggaaggaaga aagtttttgt gtttgttttt agttggattt tttttttttta ttagttaaaa 11220

tgttattttt taggaaggtt ttttgtaata ttatatttta atgttttttt ttagatattt 11280
tatattatat tattttattt aatttttttt ataattttta ttattttgat aagatttatt 11340
tgtttattgt ttttagtata tggaaatgta agttttatga ggatatagaa ttttttttatt 11400
attttattta ttgttgtatt tttgagtgtt tatattagtg ttgggtagta agtaagagtt 11460
tgataataaa tattttttga atgagggaga taggtttgaa gtttggagaa tgagatgtag 11520
aagaggtgta agatttgttg tgttttttgt aggtggtggg ggggtggtgt aggtgtttta 11580
agaattattg tgggatttgg tagggggagt gtaggtgttt tttgttaaga tagaagtgtt 11640
tagattataa tttttagtag ttatgaggag ttttagggtt tgatgggaat gggaaatttt 11700
ttaatttttt atgttttggt tttgtgggtt ttgtgggttg tttgtgaaat ttgatttggg 11760
atgtggtggt ttaattggaa ggtggattga aattttgtga tagtaagagg tttgtagtga 11820
tttgtggtgt taaggaatat agtgttttta aaagaattgg tgtttgttgt ttgttttttt 11880
ttttgggagt tttttgttta tttttagaag aggagggaag tataggtggg ttttttttagt 11940
tttgtgttgg atttttgaga attttgaagt tattttggtt gaggttaatt tttgttgtgt 12000
tttttttgta gtatgaagat tttggagatt taattgttag ttttggattg ttgtttttta 12060
gattaggatt tagttttagt ttattttttt ttttatgttt ttttgatgaa taaaaatgtg 12120
gattttgaat tgatgttatt gtttttgaa aggggggatt tgttttggtt gtttttagat 12180
tttgtggttg gtttagttgt gttttaggag ttatgggagg gggatttagt tttttttttt 12240
atttttttgg aaatagagtt tggttttttt agtgagttga gtttttgaat tgaggagtaa 12300
gaatttttg aaaatataag tttttttgta gaagaagtaa atgggagttt ttttgaagaa 12360
gaagtgaatg ggttagagtt ggggtttgga aaagttatgg aagatatttt tggggaattt 12420
gttgtagagg atgagggaga tatgtaagtg gtgatggtag tggagtgtgg agtttgggga 12480
gatgaagtgt gaggttgatt tgttttttgg ttttgagatt tatttttta ggtttttgtt 12540
tttttgttt ggtgatttag gtttattgtt ttttattttt tttttagtgt ttggaattat 12600
agtttttttt agttgttttg atttttagt ggtttttggt tagagtttag tatttaattt 12660
gagaattttt tgaaaggttg taagtggtaa ggataataat ggggtaggga gttgattatt 12720
tttgagattt ttattgtaaa atagtttagt tttttaggag agggatgttt tagagttggg 12780
agaagtggta tgtagttttt ttagattgag tttatatttt atttagtagt ttgtgttttt 12840
tatttttttt aaggatttag gggggtttat ttattttaga ggtaggttta gttttagttt 12900
tatatttgaa aagtataggt ttggttagtt ttttaatttt tttttgtttt tagggttttt 12960

gat 12963

<210> 74
<211> 3500
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 74

tttagaataa atggtagagg ttagtgagtt tagagatggt gatagggtaa tgatttaggg 60
gtagttgttt gaaatgggag taggtgaagt tatagatggg agaagatggt ttaggaagaa 120
aaatttagga atgggtagga gaggagagga ggatataggt tttgtggggt tgtagtttag 180
gatgggatta agtgtgaaga tattttagta ggtgaggtta ggttttatga atagagaagt 240
agtttttatt ttttttgatg tatggatata tagagtgtgt ggtgttgtgt ttttagagtt 300
gggttttttt gttttggttt ttagggagtg agaagtgagg ttgatttgtt tttgtttttt 360
tttgttattt taatatttat tttttttta tgtttttttt ttttaaatat gatttggatt 420
tatgttttttg tttaaatttt atgttaaatt gtaaatttta atgttggagg tggggttttg 480
tgagaagtga ttggataatg tgggtggatt ttttgttttg atgttgtttt tgtgatagag 540
attttatatg atttggttgt ttaaaagtgt gtagtatttt tttttttttt tttttttttt 600
tttatttatg ttttgttatg taagatgttt ttgttttttt tttattgttt agaatgattg 660
taagtttttt gaggtttttt taggagtaga agttattatg tttttttgtat aattgtagaa 720
tgatgagtga attaaatttt ttttttttat aaattattta gttttaggta ttttttttata 780
gtaatgtgag gatagattaa tataattttt tatttttaga tttttgtata tgtttagttt 840
tagatattat tgtttttggg agtatgtata gtgtagtttt ttgttgataa aagtaaagtt 900
ataaaaggtg ataaaaattt gtatttgggg atatttgatt gtgaaagagg gaggatagta 960
tatttgtagt tatagagatt ggggtttatt gagttgaaat ttggtagtat tttggtataa 1020
tatgtgtatg atttgtgttt aatgtttaga gattagtgtt gagtaaaata gtttggtttg 1080
gggttgttgt tgtttttatt ttttttttgt ttattagagg gtggtagagt ttttttttatt 1140
ttggagtttt tttaggggtt gttgattttt tttagttggg tttatagttt agtagggttt 1200

```
atttttattt gggttatttt ggtttatgtt tttttgttt tttgagtttt ttatatggat     1260
tttgttagtt tttttttgta gtttattggt tgtttatttg aggtttgttg gttgtttatt    1320
tgaggtttgt tggttgtttt ttgtaggtag tttttgtttt ttatattttt ttttttttg     1380
ggtttagttg aaagggtgtt ttttagggta gtttttgtg attttttagga tagtttagtt    1440
ttttataggt tttgatgttt tttatgttgt tattttatag ttttgttatt attattaatt    1500
ttttagtttt atgaagttta ttgagtgttt gtttttggt tataggaaaa ttttgtgata     1560
gggattatgt ttgttttgtt ttttgtggaa ttttagggtt tagtttagtg tttgatatgg    1620
aatagatgtt ttataaatat tggttaaatg tgtgggagat ttttaaaaag aagtatatta    1680
tttttgtgtg gtttttagta gttagagttt gttttatgtg gatatagggg tattggtatt    1740
agtatgggag gaggttagta agtgtttgtg gttgttttag gaatgaggtt ttaatttta     1800
gagttttaga agggaggata gaggtttgta gggaatagat tttttggttt gattttgtag    1860
tttaatttag agtttagggt tagtttatat tatgttgatt ttggttagta tttttagggt    1920
agttttagat aaggttggag gttttttttt gtttttagg gggtgatatt gtatatagat     1980
attatttagg aaatggattt ttttggatag gaatttggtt ttgttaagga agtggaggtg    2040
gagtttggtt tttattttt gttttaatag attttttga tttttttttat atatttgttt     2100
tgttttttttt tgggttttat gaggatttg ttttgttagg ggtttttgtg taattttaga    2160
ttttttttg gtattattat ggggaaggtg gggtgattat aggatagtta gttttgtaga     2220
gatagagatt atttaggatt gttagggaga atatggatag gttttgagtt gtagtttagt    2280
taatagatat ggagagggag ggttttttg gagtttttt taaggatagt agagtttaga      2340
gttatttatt tttttttatt atagtttttt tttttagga tatataagat attttttttt     2400
ttatatgtag gatttgggga tttttgagat ttttgggttt gggtttttat ttttgggtta    2460
gtggtggggt tggtggtatt ggagatagag ggttggtttt tttttagtta ttatttagtg    2520
agtttttttt tagtttttag agttattttt gttattttt tgttgggtat tattttattt     2580
ttttagagtt ttggagagta tggggagatt tgggattttg ttgggttttt ttgttataaa    2640
ggaaaataat tttttggtg tgatagattt aaggatagaa tatagtagag gttagtattg     2700
gggaagatag gttgtttttt taggggatgg gggtttattt attttgttga aaagatttgt    2760
ttgaggaatt gaaaatagaa gggaaaaag aggagggata aaagaggtag aaatgagagg     2820
ggaggggata gaggatattt gaataaagat tatatttatg atttatgtga tgttgagaag    2880
tatttttgtt ttaggaagag atttagggta gagggaggaa ggatagtaga ttagatagtt    2940
atagtagttt tgataaaatg tttttggaat ttaagttttt ttttatagag gaggatagag    3000
tagatagtag agattatgga gttttttttg gttttttttt atagatggtg tatttttttgg   3060
tagaggtttt tgtttatagg tgaagggagg ataatttggg agagggtggg aggagggagt    3120
tggggttttt tgggtaggat agggttgtga gatggataga gggtttttgt tggagtttga    3180
atagggaaga ggatattaga gagggatagg agttatatta gaaaaattaa attgaattgg    3240
aattggaaag gggtaggaaa attttaagag ttttattttt ttagttaatt gttattggtt    3300
attatgtttt taaaaattat aataattgta ttagatgata ttttaaataa aaatataatt    3360
agggtatgaa atattgtttt tatttgttta ttgtggatat tggaaaataa gttttaggtt    3420
gtggagggtt ttgggaattt ttatgaattt atttatagga atttgtagtt tgttttaggt    3480
attggggtgt aattaagatt                                                3500
```

<210> 75
<211> 3500
<212> DNA
<213> Artificial Sequence

<220>
<223> chemically treated genomic DNA (Homo sapiens)

<400> 75

```
gattttggtt gtattttagt gtttgggata ggttgtagat ttttgtggat gagtttatga      60
gggtttttag ggttttttat agtttggggt ttatttttta atgtttgtgg taggtggatg     120
aggatagtgt tttatgtttt ggttatgttt ttatttaaag tgttatttga tgtagttatt     180
atgattttta aaaatgtagt ggttagtgat aattaattag gaaaatagaa tttttgaggt     240
tttttgttt tttttttaatt ttagtttaat ttgatttttt tggtgtgatt tttgtttttt     300
tttgatgttt tttttttat ttaggtttta ataggagttt tttgtttgtt ttatagtttt     360
gttttattta ggagatttta gttttttttt tttatttttt tttaggttgt tttttttttta   420
tttgtgagta ggagttttg ttaggggatg tattatttgt ggggaggggt tgagggagat      480
tttatggttt ttgttgtttg ttttgttttt ttttgtggag aagagtttga gttttaggaa     540
tgttttgtta aggttgttgt gattgtttgg tttgttgttt tttttttttt tgttttgagt     600
ttttttttag ggtaggagta ttttttagta ttatgtgggt tatgggtgtg gtttttattt     660
aggtgttttt tgtttttttt tttttttatt ttgttttttt tgtttttttt ttttttttt      720
ttttattttt agtttttttag ataaattttt ttggtaaggt ggatggattt ttattttttg    780
```

ggaggataat ttgttttttt tagtgttgat ttttgttgtg ttttgttttt gggtttgtta 840
tattaggggg attatttttt tttgtgatag agaaatttag tagggttttg ggttttttta 900
tgtttttttag ggttttggga aggtgggatg atgtttaata ggaaggtgat agaggtggtt 960
ttgggggtta gaaaaaggtt tattgggtgg tggttgggga gggattagtt ttttgttttt 1020
agtattatta attttgttat tgatttaggg atggagattt aggtttagag gttttaggag 1080
tttttagatt ttgtatgtgg agggggaggt gttttgtgtg ttttggaaag agaggattgt 1140
ggtggaggga ggtgggtgat tttgggtttt gttgttttttg gggaaggttt tagggggatt 1200
tttttttttt gtgtttgttg gttgagttgt ggtttagggt ttgtttatgt ttttttttgat 1260
agttttgggt ggtttttgtt tttgtgaggt tgattgtttt gtgattattt tatttttttt 1320
atggtggtat taggagggag tttggagttg tatagggatt tttggtagaa tagggttttt 1380
ataggattta gaaaggaata gagtaggtat gtgggagaga ttagaagggt ttgttggagt 1440
aagggatgga aattaggttt tatttttatt tttttagtaa agttaggttt ttgtttaggg 1500
gaatttgttt tttgagtgat gtttgtgtgt aatgttattt tttggagggt aagaggagat 1560
ttttggtttt gtttggaatt gttttaggga tgttgattag ggttgatgtg gtgtgagttg 1620
attttgaatt ttggattagg ttgtagggtt aggttggagg atttattttt tgtaggtttt 1680
tgtttttttt tttgaagttt tgggggttga ggttttattt ttggggtagt tgtgggtatt 1740
tgttggtttt tttttatgtt ggtgttagtg tttttgtgtt tatatggaat agattttgat 1800
tgttgggggt tatatggagg tgatatgttt ttttttagag atttttttata tatttaatta 1860
gtatttatgg agtatttgtt ttgtgttagg tattgggttg ggttttggga ttttatagag 1920
agtaggatag atgtggtttt tgttatagag tttttttgta attgggagat aggtgtttag 1980
tgaattttat gggattgagg agttaatggt aatgataggg ttgtgaggtg atagtatagg 2040
gggtgttgga gtttgtgaga gattgagttg ttttggagat tatagggagt tgttttggga 2100
gatgtttttt tagttgagtt tggggaagga gggggtgtag gggataggag ttgtttgtag 2160
agggtagttg ataggtttta agtgggtggt tgataagttt taggtgggtg gttgataggt 2220
tgtagggagg agttgataga gtttgtgtga ggagtttgga gggtgaggag gatgtgggtt 2280
gaggtgattt gggtgagggt ggattttgtt gggttgtggg tttggttgag ggaggttagt 2340
agtttttggg gaggttttag ggtgggagga attttgttgt tttttggtgg ataggaggga 2400
agtgggggata gtagtggttt tagattaggt tgttttattt aatattgatt tttagatatt 2460
gaatatgggt tatgtatatg ttatgttaaa gtgttattag gttttagttt ggtgagtttt 2520
agtttttgtg gttataagtg tattgttttt ttttttttat aattagatgt ttttaaatgt 2580
agattttttgt tatttttttgt gattttgttt ttgttggtag gaggttgtgt tgtgtatgtt 2640
tttaggggta gtgatgtttg gggttaagtg tgtgtgggga tttgggagta gaagattgta 2700
ttagtttgtt tttgtattgt tataaagaaa tatttgagat tgggtaattt ataaagaaaa 2760
gaggtttaat ttgtttatta ttttgtagtt gtataggaag tatagtggtt tttgtttttg 2820
gggaggtttt agaaaattta taattatttt ggatggtgaa ggggaaatag gaatgtttta 2880
tatggtagag tatgagtaag agagagagag agagaggggga gaggtgttat atatttttaa 2940
ataattagat tatgtgagat ttttattata gaaatagtat taaagtagaa aatttatttg 3000
tattatttaa ttattttttta taaggtttta tttttaatat tggggtttat aatttgatat 3060
gagatttggg tggggatata gatttaaatt atatttgaga gagaggggta tgaggagaag 3120
gtgaatgttg gggtagtaga gaggagtagg gataagttaa ttttattttt tatttttttgg 3180
ggattagaat aggagagttt gattttgggg gtatagtatt atatattttg tgtgtttgtg 3240
tattagggga ggtgggagtt gtttttttgt ttatgggatt tggttttatt tgttgagatg 3300
tttttatatt tagttttatt ttgggttgta gttttataga gtttgtgttt tttttttttt 3360
ttttgtttat ttttggattt ttttttttga attatttttt tttatttgtg gttttatttg 3420
tttttgtttt aggtagttgt ttttggatta ttgttttgtt attatttttg ggtttattgg 3480
tttttgttat ttgttttgag 3500

<210> 76
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection primer for ESR1

<400> 76

aggaggggga attaaataga 20

<210> 77
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection primer for ESR1

<400> 77

acaataaaac catcccaaat ac 22

<210> 78
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection primer for p21

<400> 78

ggattagtgg gaatagaggt g 21

<210> 79
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection primer for p21

<400> 79

aaacccaaac tcctaactac c 21

<210> 80
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection primer for p27

<400> 80

gtggggaggt agttgaaga 19

<210> 81
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection primer for p27

<400> 81

atacacccct aacccaaaat 20

<210> 82
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection primer for p16

<400> 82

ttgaaaatta agggttgagg 20

<210> 83
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection primer for p16

<400> 83

caccctctaa taaccaacca 20

<210> 84
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection primer for PGR

<400> 84

gagggggtag tggaatttag 20

<210> 85
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection primer for PGR

<400> 85

cctttacctt caactcaatc a 21

<210> 86
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection primer for MB

<400> 86

gtttttggta aaggggtaga a 21

<210> 87
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection primer for MB

<400> 87

cctaaaatat caacctccac ct 22

<210> 88
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection primer for PCNA

<400> 88

tttttaggtt gtaaggaggt ttt 23

<210> 89
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection primer for PCNA

<400> 89

taaatacctc caacaccttt ct 22

<210> 90
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection primer for CDC2

<400> 90

attagaagtg aaagtaatgg aattt 25

<210> 91
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection primer for CDC2

<400> 91

tcaatttcca aaaaccaac 19

<210> 92
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection primer for ERBB2

<400> 92

ggagggggta gagttattag tt 22

<210> 93

<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection primer for ERBB2

<400> 93

tatacttcct caaacaaccc tc 22

<210> 94
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection primer for TP53

<400> 94

gattgggtaa gtttttgatt ga 22

<210> 95
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection primer for TP53

<400> 95

aaatctccca acaatacaac tc 22

<210> 96
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection primer for CEA

<400> 96

gtttaggatg ggattaagtg tg 22

<210> 97
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection primer for CEA

<400> 97

aatcaaatat ccccaaatac aa 22

<210> 98
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 98

agatatatcg gagtttgg 18

<210> 99
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 99

agatatattg gagtttgg 18

<210> 100
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 100

ccaaactccg atatatct 18

<210> 101
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 101

ccaaactcca atatatct 18

<210> 102
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 102

gtttggtacg gggtatat 18

<210> 103
<211> 18
<212> DNA
<213> Artificial Sequence

<220>

<223> Detection oligonucleotide for ESR1

<400> 103

gtttggtatg gggtatat 18

<210> 104
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 104

atataccccg taccaaac 18

<210> 105
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 105

atatacccca taccaaac 18

<210> 106
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 106

gagaaagtcg gtttttgg 18

<210> 107
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 107

gagaaagttg gtttttgg 18

<210> 108
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 108

ccaaaaaccg actttctc 18

<210> 109
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 109

ccaaaaacca actttctc 18

<210> 110
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 110

tttttggtcg tgaaattt 18

<210> 111
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 111

tttttggttg tgaaattt 18

<210> 112
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 112

aaatttcacg accaaaaa 18

<210> 113
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 113

aaatttcaca accaaaaa 18

<210> 114
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 114

tttagtagcg acgataag 18

<210> 115
<211> 18
<212> DNA

<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 115

tttagtagtg atgataag 18

<210> 116
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 116

cttatcgtcg ctactaaa 18

<210> 117
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 117

cttatcatca ctactaaa 18

<210> 118
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 118

gtttaaatcg agttgtgt 18

<210> 119
<211> 18

<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 119

gtttaaattg agttgtgt 18

<210> 120
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 120

acacaactcg atttaaac 18

<210> 121
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 121

acacaactca atttaaac 18

<210> 122
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 122

tatgagttcg ggagatta 18

<210> 123
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 123

tatgagtttg ggagatta 18

<210> 124
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 124

taatctcccg aactcata 18

<210> 125
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 125

taatctccca aactcata 18

<210> 126
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 126

tggaggttcg ggagttta 18

<210> 127
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 127

tggaggtttg ggagttta 18

<210> 128
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 128

taaactcccg aacctcca 18

<210> 129
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 129

taaactccca aacctcca 18

<210> 130
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 130

taggttttcg gggtaggg 18

<210> 131
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 131

taggtttttg gggtaggg 18

<210> 132
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 132

ccctaccccg aaaaccta 18

<210> 133
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 133

ccctacccca aaaaccta 18

<210> 134
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 134

ggtagggtcg gggttaga 18

<210> 135
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 135

ggtagggttg gggttaga 18

<210> 136
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 136

tctaaccccg accctacc 18

<210> 137
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 137

tctaacccca accctacc 18

<210> 138
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 138

tttaatttcg ggttgtgt 18

<210> 139
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 139

tttaattttg ggttgtgt 18

<210> 140

<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 140

acacaacccg aaattaaa 18

<210> 141
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 141

acacaaccca aaattaaa 18

<210> 142
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 142

aggtggttcg tcggtttt 18

<210> 143
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 143

aggtggtttg ttggtttt 18

<210> 144
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 144

aaaaccgacg aaccacct 18

<210> 145
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ESR1

<400> 145

aaaaccaaca aaccacct 18

<210> 146
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p21

<400> 146

aggtgtatcg tttttata 18

<210> 147
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p21

<400> 147

aggtgtattg tttttata 18

<210> 148
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p21

<400> 148

tataaaaacg atacacct 18

<210> 149
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p21

<400> 149

tataaaaaca atacacct 18

<210> 150
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p21

<400> 150

tgggttagcg gtgagtta 18

<210> 151
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p21

<400> 151

tgggttagtg gtgagtta 18

<210> 152
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p21

<400> 152

taactcaccg ctaaccca 18

<210> 153
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p21

<400> 153

taactcacca ctaaccca 18

<210> 154
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p21

<400> 154

gtttatttcg tggggaaa 18

<210> 155
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p21

<400> 155

gtttattttg tggggaaa 18

<210> 156
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p21

<400> 156

tttccccacg aaataaac 18

<210> 157
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p21

<400> 157

tttccccaca aaataaac 18

<210> 158
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p21

<400> 158

ttgtagtacg cgaggttt 18

<210> 159
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p21

<400> 159

ttgtagtatg tgaggttt 18

<210> 160
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p21

<400> 160

aaacctcgcg tactacaa 18

<210> 161
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p21

<400> 161

aaacctcaca tactacaa 18

<210> 162
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p21

<400> 162

ttggaattcg gttaggtt 18

<210> 163
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p21

<400> 163

ttggaatttg gttaggtt 18

<210> 164
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p21

<400> 164

aacctaaccg aattccaa 18

<210> 165
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p21

<400> 165

aacctaacca aattccaa 18

<210> 166
<211> 18
<212> DNA

<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p21

<400> 166

agttggttcg gcgttggg 18

<210> 167
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p21

<400> 167

agttggtttg gtgttggg 18

<210> 168
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p21

<400> 168

cccaacgccg aaccaact 18

<210> 169
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p21

<400> 169

cccaacacca aaccaact 18

<210> 170
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 170

ttgtttatcg ttttattt 18

<210> 171
<211> 18
<212> DNA
<213> Artificial Sequence

<220>

<223> Detection oligonucleotide for p27

<400> 171

ttgtttattg ttttattt 18

<210> 172
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 172

aaataaaacg ataaacaa 18

<210> 173
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 173

aaataaaaca ataaacaa 18

<210> 174
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 174

ttttattacg gtgtttaa 18

<210> 175
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 175

ttttattatg gtgtttaa 18

<210> 176
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 176

ttaaacaccg taataaaa 18

<210> 177
<211> 18

<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 177

ttaaacacca taataaaa 18

<210> 178
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 178

aagagaaacg ttggaata 18

<210> 179
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 179

aagagaaatg ttggaata 18

<210> 180
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 180

tattccaacg tttctctt 18

<210> 181
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 181

tattccaaca tttctctt 18

<210> 182
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 182

tttgatttcg aggggagt 18

<210> 183
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 183

tttgattttg aggggagt 18

<210> 184
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 184

actcccctcg aaatcaaa 18

<210> 185
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 185

actcccctca aaatcaaa 18

<210> 186
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 186

gtatttggcg gttggatt 18

<210> 187

<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 187

gtatttggtg gttggatt 18

<210> 188
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 188

aatccaaccg ccaaatac 18

<210> 189
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 189

aatccaacca ccaaatac 18

<210> 190
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 190

tataatttcg ggaaagaa 18

<210> 191
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 191

tataattttg ggaaagaa 18

<210> 192
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 192

ttctttcccg aaattata 18

<210> 193
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 193

ttctttccca aaattata 18

<210> 194
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 194

gaaagggacg agttttta 18

<210> 195
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 195

gaaagggatg agttttta 18

<210> 196
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 196

taaaaactcg tccctttc 18

<210> 197
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 197

taaaaactca tccctttc 18

<210> 198
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 198

tttttatacg tagttaat 18

<210> 199
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 199

tttttatatg tagttaat 18

<210> 200
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 200

attaactacg tataaaaa 18

<210> 201
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p27

<400> 201

attaactaca tataaaaa 18

<210> 202
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 202

tttttagtcg tataggtg 18

<210> 203
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 203

tttttagttg tataggtg 18

<210> 204
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 204

cacctatacg actaaaaa 18

<210> 205
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 205

cacctataca actaaaaa 18

<210> 206
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 206

ggttgtatcg cggaggaa 18

<210> 207
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 207

ggttgtattg tggaggaa 18

<210> 208

<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 208

ttcctccgcg atacaacc 18

<210> 209
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 209

ttcctccaca atacaacc 18

<210> 210

<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 210

agagtgaacg tatttaaa 18

<210> 211
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 211

agagtgaatg tatttaaa 18

<210> 212
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 212

tttaaatacg ttcactct 18

<210> 213
<211> 18
<212> DNA

<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 213

tttaaataca ttcactct 18

<210> 214
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 214

tttgttaacg ttggtttt 18

<210> 215
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 215

tttgttaatg ttggtttt 18

<210> 216
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 216

aaaaccaacg ttaacaaa 18

<210> 217
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 217

aaaaccaaca ttaacaaa 18

<210> 218
<211> 18
<212> DNA
<213> Artificial Sequence

<220>

<223> Detection oligonucleotide for p16

<400> 218

ggttttggcg agggttgt 18

<210> 219
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 219

ggttttggtg agggttgt 18

<210> 220
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 220

acaaccctcg ccaaaacc 18

<210> 221
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 221

acaaccctca ccaaaacc 18

<210> 222
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 222

gttgttttcg gttggtgt 18

<210> 223
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 223

gttgtttttg gttggtgt 18

<210> 224
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 224

acaccaaccg aaaacaac 18

<210> 225
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 225

acaccaacca aaaacaac 18

<210> 226
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 226

ggtgttttcg ggggagat 18

<210> 227
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 227

ggtgttttttg ggggagat 18

<210> 228
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 228

atctcccccg aaaacacc 18

<210> 229
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 229

atctccccca aaaacacc 18

<210> 230
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 230

atttggggcg attttagg 18

<210> 231
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 231

atttggggtg attttagg 18

<210> 232
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 232

cctaaaatcg ccccaaat 18

<210> 233
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 233

cctaaaatca ccccaaat 18

<210> 234
<211> 18
<212> DNA

<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 234

gttatattcg ttaagtgt 18

<210> 235
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 235

gttatatttg ttaagtgt 18

<210> 236
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 236

acacttaacg aatataac 18

<210> 237
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 237

acacttaaca aatataac 18

<210> 238
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 238

taagtgttcg gagttaat 18

<210> 239
<211> 18
<212> DNA
<213> Artificial Sequence

<220>

<223> Detection oligonucleotide for p16

<400> 239

taagtgtttg gagttaat 18

<210> 240
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 240

attaactccg aacactta 18

<210> 241
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 241

attaactcca aacactta 18

<210> 242
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 242

gatagggtcg gaggggt 18

<210> 243
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 243

gatagggttg gaggggt 18

<210> 244
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 244

acccccctccg accctatc 18

<210> 245
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 245

accccctcca accctatc 18

<210> 246
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 246

gttagtatcg gaggaaga 18

<210> 247
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 247

gttagtattg gaggaaga 18

<210> 248
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for p16

<400> 248

tcttcctccg atactaac 18

<210> 249
<211> 18
<212> DNA
<213> Artificial Sequence

<220>

<223> Detection oligonucleotide for p16

<400> 249

tcttcctcca atactaac 18

<210> 250
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 250

agtatgtacg agtttgat 18

<210> 251
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 251

agtatgtatg agtttgat 18

<210> 252
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 252

atcaaactcg tacatact 18

<210> 253
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 253

atcaaactca tacatact 18

<210> 254
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 254

gaaaaagtcg ggagataa 18

<210> 255

<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 255

gaaaaagttg ggagataa 18

<210> 256
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 256

ttatctcccg actttttc 18

<210> 257
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 257

ttatctccca actttttc 18

<210> 258
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 258

ttaagtgtcg gatttgtg 18

<210> 259
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 259

ttaagtgttg gatttgtg 18

<210> 260
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 260

cacaaatccg acacttaa 18

<210> 261
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 261

cacaaatcca acacttaa 18

<210> 262
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 262

gtattttgcg tttttagt 18

<210> 263
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 263

gtattttgtg tttttagt 18

<210> 264
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 264

actaaaaacg caaaatac 18

<210> 265
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 265

actaaaaaca caaaatac 18

<210> 266
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 266

ttagttttcg gatagaag 18

<210> 267
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 267

ttagtttttg gatagaag 18

<210> 268
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 268

cttctatccg aaaactaa 18

<210> 269
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 269

cttctatcca aaaactaa 18

<210> 270
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 270

gaatttttcg agttagga 18

<210> 271
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 271

gaatttttg agttagga 18

<210> 272
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 272

tcctaactcg aaaaattc 18

<210> 273
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 273

tcctaactca aaaaattc 18

<210> 274
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 274

ttaggagacg agattttt 18

<210> 275
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 275

ttaggagatg agattttt 18

<210> 276
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 276

aaaaatctcg tctcctaa 18

<210> 277
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 277

aaaaatctca tctcctaa 18

<210> 278
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 278

gggataaacg atagttat 18

<210> 279
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 279

gggataaatg atagttat 18

<210> 280
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 280

ataactatcg tttatccc 18

<210> 281
<211> 18
<212> DNA

<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 281

ataactatca tttatccc 18

<210> 282
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 282

tagaataacg ggtggaaa 18

<210> 283
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 283

tagaataatg ggtggaaa 18

<210> 284
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 284

tttccacccg ttattcta 18

<210> 285
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 285

tttccaccca ttattcta 18

<210> 286
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 286

gattttatcg gtaattgg 18

<210> 287
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 287

gattttattg gtaattgg 18

<210> 288
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 288

ccaattaccg ataaaatc 18

<210> 289
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 289

ccaattacca ataaaatc 18

<210> 290
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 290

gttttgggcg gggttttt 18

<210> 291
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 291

gttttgggtg gggttttt 18

<210> 292
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 292

aaaaaccccg cccaaaac 18

<210> 293
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 293

aaaaacccca cccaaaac 18

<210> 294
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 294

ttattaatcg gggtaagt 18

<210> 295
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 295

ttattaattg gggtaagt 18

<210> 296
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 296

acttaccccg attaataa 18

<210> 297
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 297

acttacccca attaataa 18

<210> 298
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 298

agtgttttcg tattattg 18

<210> 299
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 299

agtgtttttg tattattg 18

<210> 300
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 300

caataatacg aaaacact 18

<210> 301
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 301

caataataca aaaacact 18

<210> 302

<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 302

gagattttcg gagatgat 18

<210> 303
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 303

gagattttg gagatgat 18

<210> 304
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 304

atcatctccg aaaatctc 18

<210> 305
<211> 18

<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 305

atcatctcca aaaatctc 18

<210> 306
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 306

gagaggttcg attagttt 18

<210> 307
<211> 18
<212> DNA

<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 307

gagaggtttg attagttt 18

<210> 308
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 308

aaactaatcg aacctctc 18

<210> 309
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 309

aaactaatca aacctctc 18

<210> 310
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 310

gaatttagcg agggattg 18

<210> 311
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 311

gaatttagtg agggattg 18

<210> 312
<211> 18
<212> DNA
<213> Artificial Sequence

<220>

<223> Detection oligonucleotide for PGR

<400> 312

caatccctcg ctaaattc 18

<210> 313
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PGR

<400> 313

caatccctca ctaaattc 18

<210> 314
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 314

agaaggtgcg tgagaggt 18

<210> 315
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 315

agaaggtgtg tgagaggt 18

<210> 316
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 316

acctctcacg caccttct 18

<210> 317
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 317

acctctcaca caccttct 18

<210> 318
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 318

agaggttgcg aatggtta 18

<210> 319
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 319

agaggttgtg aatggtta 18

<210> 320
<211> 18
<212> DNA
<213> Artificial Sequence

<220>

<223> Detection oligonucleotide for MB

<400> 320

taaccattcg caacctct 18

<210> 321
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 321

taaccattca caacctct 18

<210> 322
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 322

gggttagtcg gggtattt 18

<210> 323
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 323

gggttagttg gggtattt 18

<210> 324
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 324

aaataccccg actaaccc 18

<210> 325
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 325

aaatacccca actaaccc 18

<210> 326
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 326

gttgttggcg tcggtttt 18

<210> 327
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 327

gttgttggtg tcggtttt 18

<210> 328

<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 328

aaaaccgacg ccaacaac 18

<210> 329
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 329

aaaaccgaca ccaacaac 18

<210> 330
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 330

tttttatacg tataatta 18

<210> 331
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 331

tttttatatg tataatta 18

<210> 332
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 332

taattatacg tataaaaa 18

<210> 333
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 333

taattataca tataaaaa 18

<210> 334
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 334

ttttgtttcg ttataatg 18

<210> 335
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 335

ttttgttttg ttataatg 18

<210> 336
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 336

cattataacg aaacaaaa 18

<210> 337
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 337

cattataaca aaacaaaa 18

<210> 338
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 338

ggggatagcg agttattg 18

<210> 339
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 339

ggggatagtg agttattg 18

<210> 340
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 340

caataactcg ctatcccc 18

<210> 341
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 341

caataactca ctatcccc 18

<210> 342
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 342

ttattgagcg atttttgt 18

<210> 343
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 343

ttattgagtg atttttgt 18

<210> 344
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 344

acaaaaatcg ctcaataa 18

<210> 345
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 345

acaaaaatca ctcaataa 18

<210> 346
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 346

ttagattgcg ttatgggg 18

<210> 347
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 347

ttagattgtg ttatgggg 18

<210> 348
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 348

ccccataacg caatctaa 18

<210> 349
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 349

ccccataaca caatctaa 18

<210> 350
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 350

gggtttagcg acggggaa 18

<210> 351
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 351

gggtttagtg acggggaa 18

<210> 352
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 352

ttccccgtcg ctaaaccc 18

<210> 353
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 353

ttccccgtca ctaaaccc 18

<210> 354
<211> 18
<212> DNA

<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 354

gtgttgaacg tttggggg 18

<210> 355
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 355

gtgttgaatg tttggggg 18

<210> 356
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 356

cccccaaacg ttcaacac 18

<210> 357
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for MB

<400> 357

cccccaaaca ttcaacac 18

<210> 358
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 358

gggtttgacg agtcggga 18

<210> 359
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 359

gggtttgatg agttggga 18

<210> 360
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 360

tcccgactcg tcaaaccc 18

<210> 361
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 361

tcccaactca tcaaaccc 18

<210> 362
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 362

tatatgttcg gatttgtt 18

<210> 363
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 363

tatatgtttg gatttgtt 18

<210> 364
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 364

aacaaatccg aacatata 18

<210> 365
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 365

aacaaatcca aacatata 18

<210> 366
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 366

ttgttttgcg gtcgggtt 18

<210> 367
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 367

ttgttttgtg gttgggtt 18

<210> 368
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 368

aacccgaccg caaaacaa 18

<210> 369
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 369

aacccaacca caaaacaa 18

<210> 370
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 370

taaagaggcg gggagatt 18

<210> 371
<211> 18
<212> DNA

<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 371

taaagaggtg gggagatt 18

<210> 372
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 372

aatctccccg cctcttta 18

<210> 373
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 373

aatctcccca cctcttta 18

<210> 374
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 374

tatggatacg attggttt 18

<210> 375

<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 375

tatggatatg attggttt 18

<210> 376
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 376

aaaccaatcg tatccata 18

<210> 377
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 377

aaaccaatca tatccata 18

<210> 378
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 378

gtattaaacg gttgtagg 18

<210> 379
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 379

gtattaaatg gttgtagg 18

<210> 380
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 380

cctacaaccg tttaatac 18

<210> 381
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 381

cctacaacca tttaatac 18

<210> 382
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 382

gttgtaggcg tagtagag 18

<210> 383
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 383

gttgtaggtg tagtagag 18

<210> 384
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 384

ctctactacg cctacaac 18

<210> 385
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 385

ctctactaca cctacaac 18

<210> 386
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 386

agagtggtcg ttgttttt 18

<210> 387
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 387

agagtggttg ttgttttt 18

<210> 388
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 388

aaaaacaacg accactct 18

<210> 389
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 389

aaaaacaaca accactct 18

<210> 390
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 390

tttgaagtcg aaattagt 18

<210> 391
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 391

tttgaagttg aaattagt 18

<210> 392
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 392

actaatttcg acttcaaa 18

<210> 393
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 393

actaatttca acttcaaa 18

<210> 394
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 394

gtttgtagcg gcgttgtt 18

<210> 395
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 395

gtttgtagtg gtgttgtt 18

<210> 396
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 396

aacaacgccg ctacaaac 18

<210> 397
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 397

aacaacacca ctacaaac 18

<210> 398
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 398

tgttatttcg ttattatg 18

<210> 399
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 399

tgttattttg ttattatg 18

<210> 400
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 400

cataataacg aaataaca 18

<210> 401
<211> 18
<212> DNA

<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 401

cataataaca aaataaca 18

<210> 402
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 402

tttatttacg tagtggga 18

<210> 403
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 403

tttatttatg tagtggga 18

<210> 404
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 404

tcccactacg taaataaa 18

<210> 405
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for PCNA

<400> 405

tcccactaca taaataaa 18

<210> 406
<211> 18
<212> DNA
<213> Artificial Sequence

<220>

<223> Detection oligonucleotide for CDC2

<400> 406

tagtaggacg atattttt 18

<210> 407
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 407

tagtaggatg atattttt 18

<210> 408
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 408

aaaaatatcg tcctacta 18

<210> 409
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 409

aaaaatatca tcctacta 18

<210> 410
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 410

tattttttcg attggagg 18

<210> 411
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 411

tattttttg attggagg 18

<210> 412
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 412

cctccaatcg aaaaaata 18

<210> 413
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 413

cctccaatca aaaaaata 18

<210> 414
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 414

taccttcccg aataacta 18

<210> 415
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 415

taccttccca aataacta 18

<210> 416
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 416

aggtattgcg gtagttgg 18

<210> 417
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 417

aggtattgtg gtagttgg 18

<210> 418
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 418

ccaactaccg caatacct 18

<210> 419
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 419

ccaactacca caatacct 18

<210> 420
<211> 18
<212> DNA
<213> Artificial Sequence

<220>

<223> Detection oligonucleotide for CDC2

<400> 420

gggttattcg attggtga 18

<210> 421
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 421

gggttatttg attggtga 18

<210> 422
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 422

tcaccaatcg aataaccc 18

<210> 423
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 423

tcaccaatca aataaccc 18

<210> 424
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 424

ggtgaattcg gggttttt 18

<210> 425
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 425

ggtgaatttg gggttttt 18

<210> 426
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 426

aaaaaccccg aattcacc 18

<210> 427
<211> 18
<212> DNA

<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 427

aaaaacccca aattcacc 18

<210> 428
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 428

tttttagcg cggtgagt 18

<210> 429
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 429

tttttagtg tggtgagt 18

<210> 430
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 430

actcaccgcg ctaaaaaa 18

<210> 431
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 431

actcaccaca ctaaaaaa 18

<210> 432
<211> 18
<212> DNA
<213> Artificial Sequence

<220>

<223> Detection oligonucleotide for CDC2

<400> 432

aaattgttcg tatttggt 18

<210> 433
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 433

aaattgtttg tatttggt 18

<210> 434
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 434

accaaatacg aacaattt 18

<210> 435
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CDC2

<400> 435

accaaataca aacaattt 18

<210> 436
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ERBB2

<400> 436

ggatttttcg aggaaaag 18

<210> 437
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ERBB2

<400> 437

ggatttttttg aggaaaag 18

<210> 438
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ERBB2

<400> 438

tgtgagaacg gttgtagg 18

<210> 439
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ERBB2

<400> 439

tgtgagaatg gttgtagg 18

<210> 440
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ERBB2

<400> 440

aggagggacg atttaggt 18

<210> 441
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ERBB2

<400> 441

aggagggatg atttaggt 18

<210> 442
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ERBB2

<400> 442

aggtttgcgc gaagagag 18

<210> 443
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ERBB2

<400> 443

aggtttgtgt gaagagag 18

<210> 444
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ERBB2

<400> 444

ggagttgtcg atttttag 18

<210> 445
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ERBB2

<400> 445

ggagttgttg atttttag 18

<210> 446
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ERBB2

<400> 446

ttagatttcg ttggaatg 18

<210> 447
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ERBB2

<400> 447

ttagattttg ttggaatg 18

<210> 448
<211> 18
<212> DNA

<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ERBB2

<400> 448

ggagggggcg agttggga 18

<210> 449
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ERBB2

<400> 449

ggagggggtg agttggga 18

<210> 450
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ERBB2

<400> 450

ttgggagcgc gtttgttt 18

<210> 451
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for ERBB2

<400> 451

ttgggagtgt gtttgttt 18

<210> 452
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 452

tttttagttc gggaaaat 18

<210> 453
<211> 18
<212> DNA
<213> Artificial Sequence

<220>

<223> Detection oligonucleotide for TP53

<400> 453

tttttagttt gggaaaat 18

<210> 454
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 454

ggaaaatcgt tggggttg 18

<210> 455
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 455

ggaaaattgt tggggttg 18

<210> 456
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 456

ggatttagcg agtttggg 18

<210> 457
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 457

ggatttagtg agtttggg 18

<210> 458
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 458

ggattattcg aatttaaa 18

<210> 459
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 459

ggattatttg aatttaaa 18

<210> 460
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 460

aagttgaacg tttaggta 18

<210> 461
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 461

aagttgaatg tttaggta 18

<210> 462
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 462

ttttgagtcg gtttaaag 18

<210> 463
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 463

ttttgagttg gtttaaag 18

<210> 464
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 464

gtttaaagcg tatttttt 18

<210> 465
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 465

gtttaaagtg tatttttt 18

<210> 466
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 466

tatttattcg gtgttggg 18

<210> 467
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 467

tatttatttg gtgttggg 18

<210> 468
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 468

gtgttgggcg tagggaat 18

<210> 469
<211> 18
<212> DNA

<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 469

gtgttgggtg tagggaat 18

<210> 470
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 470

ttggatttcg aaatattg 18

<210> 471
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 471

ttggattttg aaatattg 18

<210> 472
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 472

ttttatttcg aaatgatt 18

<210> 473
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 473

ttttattttg aaatgatt 18

<210> 474
<211> 18
<212> DNA
<213> Artificial Sequence

<220>

<223> Detection oligonucleotide for TP53

<400> 474

gggtgattcg gggagttt 18

<210> 475
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 475

gggtgatttg gggagttt 18

<210> 476
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 476

ttgttagtcg tggaagtg 18

<210> 477
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 477

ttgttagttg tggaagtg 18

<210> 478
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 478

ggggtttgtt cgttaggt 18

<210> 479
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 479

ggggtttgtt tgttaggt 18

<210> 480
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 480

gaggatcgtc gtaatttg 18

<210> 481
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 481

gaggattgtt gtaatttg 18

<210> 482

<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 482

gagaggttcg gtagtttt 18

<210> 483
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 483

gagaggtttg gtagtttt 18

<210> 484
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 484

tttttgtcg gagtagtt 18

<210> 485
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 485

tttttgttg gagtagtt 18

<210> 486
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 486

tatttattcg atgagagg 18

<210> 487
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 487

tatttatttg atgagagg 18

<210> 488
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 488

ttttgagtta cgggtttt 18

<210> 489
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for TP53

<400> 489

ttttgagtta tgggtttt 18

<210> 490

<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 490

ttgatgtacg gatatata 18

<210> 491
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 491

ttgatgtatg gatatata 18

<210> 492
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 492

tttagagtcg ggtttttt 18

<210> 493
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 493

tttagagttg ggtttttt 18

<210> 494
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 494

tatgttttcg tttaaatt 18

<210> 495
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 495

tatgtttttg tttaaatt 18

<210> 496
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 496

ggataatgcg ggtggatt 18

<210> 497
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 497

ggataatgtg ggtggatt 18

<210> 498
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 498

atgtaagacg tttttgtt 18

<210> 499
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 499

atgtaagatg tttttgtt 18

<210> 500
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 500

atgatgagcg aattaaat 18

<210> 501
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 501

atgatgagtg aattaaat 18

<210> 502
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 502

tagtaatgcg aggataga 18

<210> 503
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 503

tagtaatgtg aggataga 18

<210> 504
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 504

atgtatagcg tagttttt 18

<210> 505
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 505

atgtatagtg tagttttt 18

<210> 506
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 506

tttttgtcg ataaaagt 18

<210> 507
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 507

tttttgttg ataaaagt 18

<210> 508
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 508

aagtgttcgc ggttgttt 18

<210> 509
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 509

aagtgtttgt ggttgttt 18

<210> 510
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 510

agatttttcg gtttgatt 18

<210> 511
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 511

agatttttg gtttgatt 18

<210> 512
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 512

atattacgtc gattttgg 18

<210> 513
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 513

atattatgtt gattttgg 18

<210> 514
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 514

gataaggtcg gaggtttt 18

<210> 515
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 515

gataaggttg gaggtttt 18

<210> 516
<211> 18
<212> DNA

<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 516

ttaggaaacg gatttttt 18

<210> 517
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 517

ttaggaaatg gatttttt 18

<210> 518
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 518

gttagtttcg tagaggat 18

<210> 519
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 519

gttagttttg tagaggat 18

<210> 520
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 520

ttttgagtcg tagtttag 18

<210> 521
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 521

ttttgagttg tagtttag 18

<210> 522
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 522

aatagatacg gagaggga 18

<210> 523
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 523

aatagatatg gagaggga 18

<210> 524
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection oligonucleotide for CEA

<400> 524

tggttaaatg tgtgggagat 20

<210> 525
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection primer for CEA

<400> 525

tcctgagtga tgtctgtgtg 20

<210> 526
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection primer for p16

<400> 526

atgacaccaa acacccccgat 20

<210> 527
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Detection primer for p16

<400> 527

ctgtccctca aatcctctg 19